Vol. XXVIII. Part 1.

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The Journal of the Department of Agriculture of Victoria, Australia.

January, 1930.

PRINCIPAL CONTENTS

The Production of the Best Butter

Registered Fertilizers and Unit Values for the Year 1930

Poultry Feeding Tests

Brown Rot and Transit Rot

Apple Export Season 1930

Mycotic Dermatitis

Crop and Fallow Competitions

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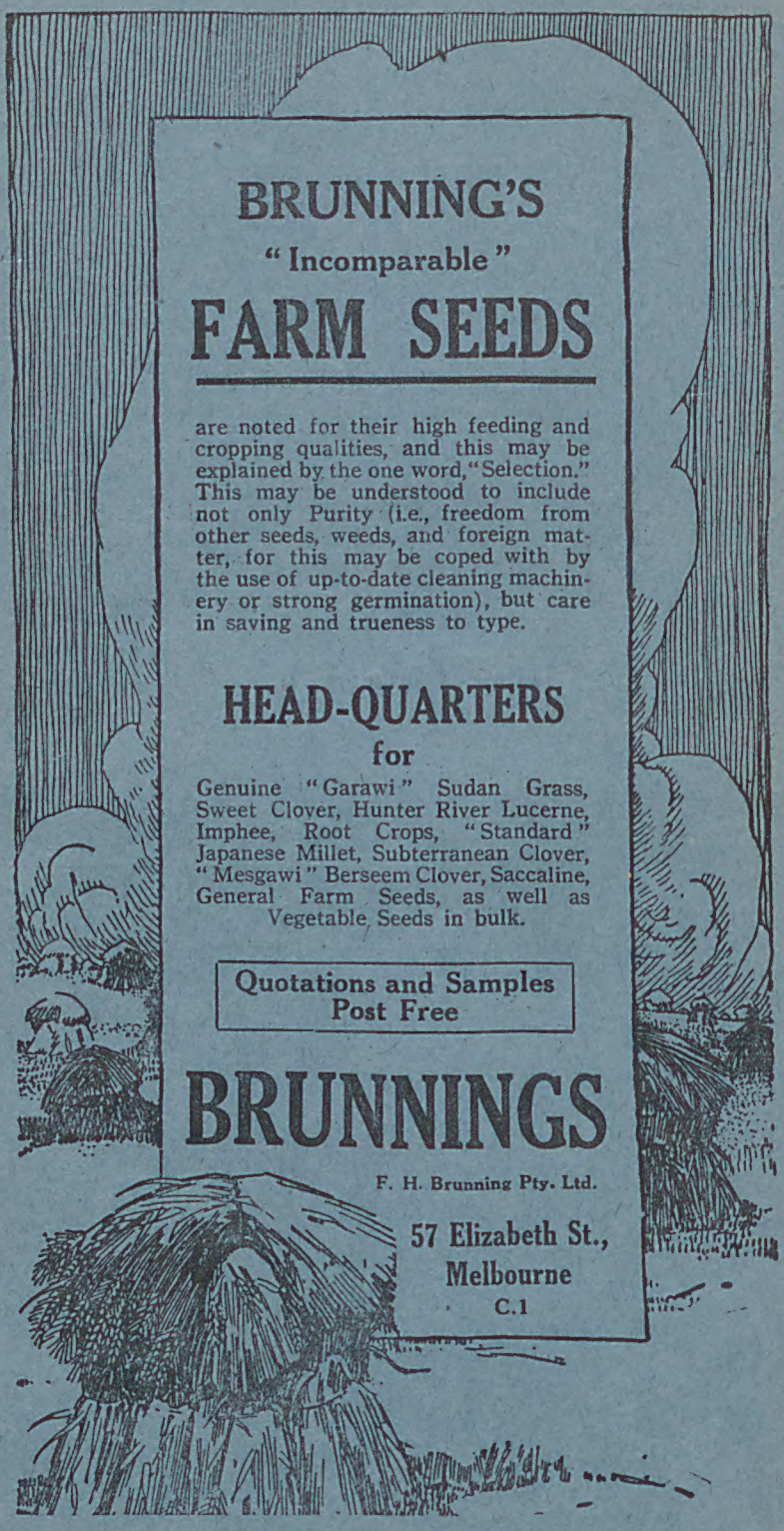

NATIONAL MUSEUM OF VICTORIA

THE JOURNAL

OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

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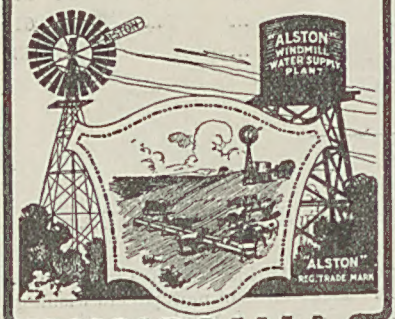

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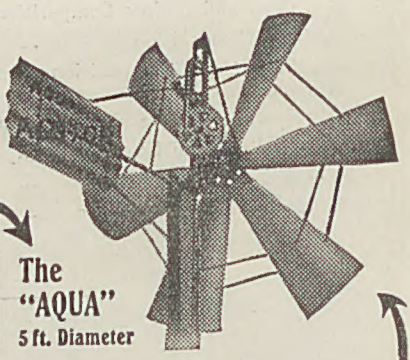

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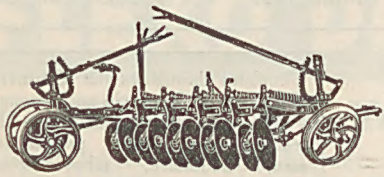

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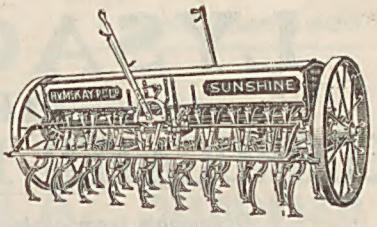

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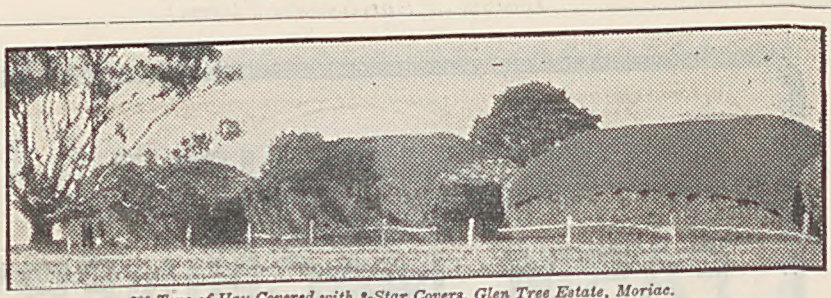

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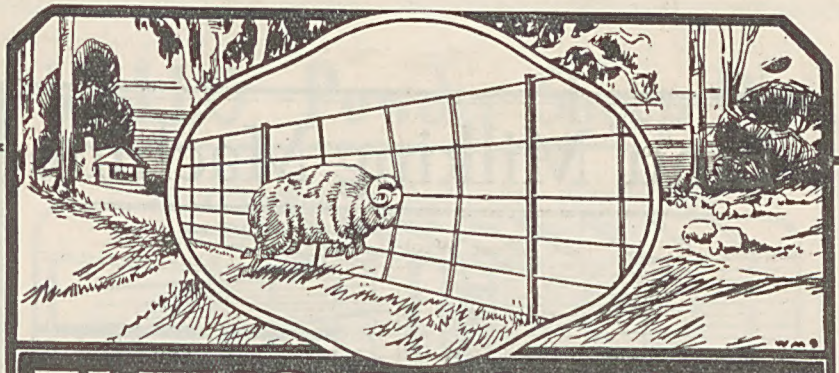

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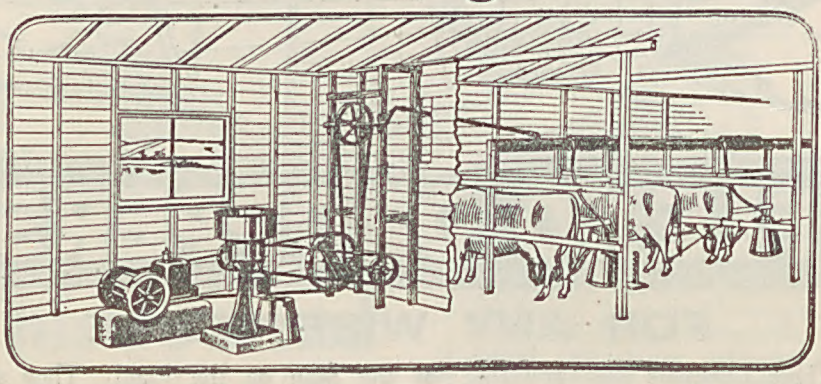

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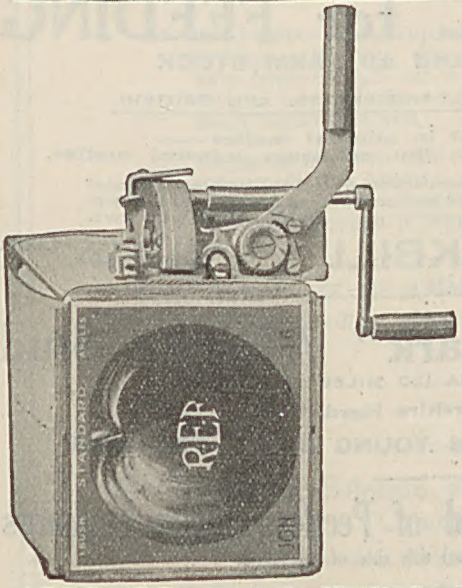

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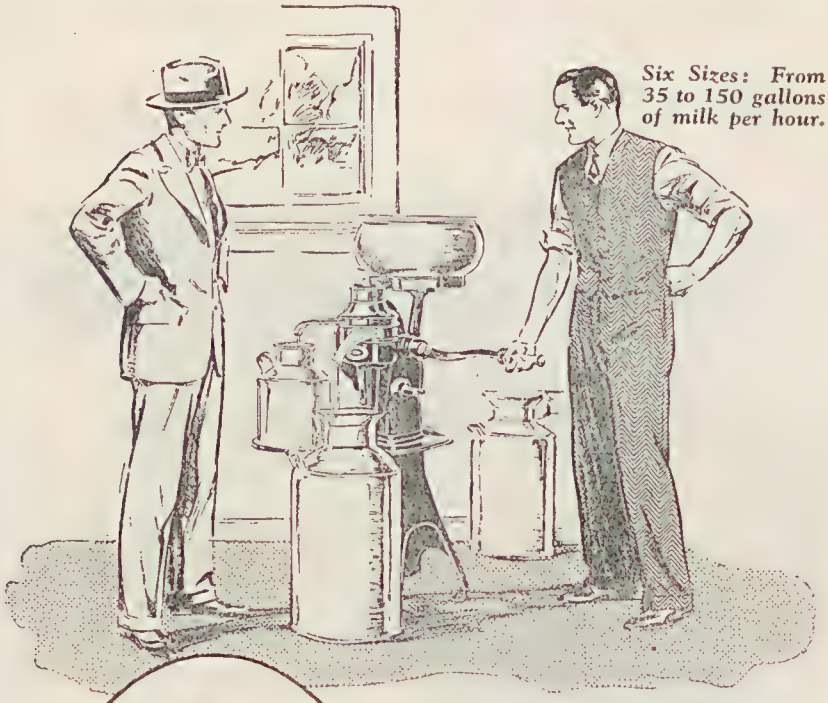

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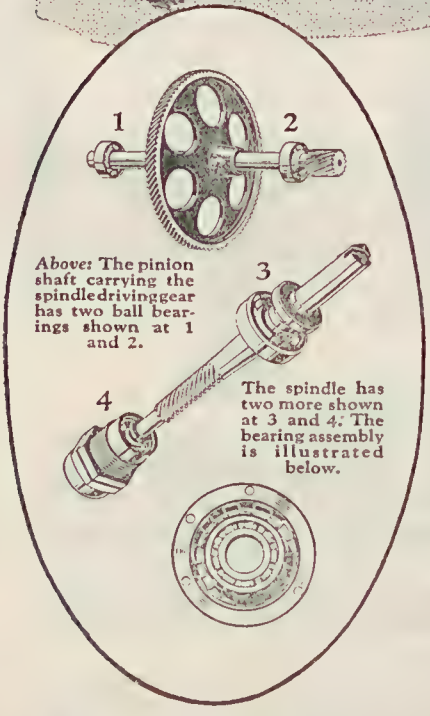

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THE JOURNAL

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Vol. XXVIII. January, 1930. Part 1

THE PRODUCTION OF THE BEST BUTTER.

(Extract from a Wireless Talk by R. Crowe, Exports Superintendent.)

Cleanliness on the Farm.

Notwithstanding the printed instructions sent to every user of milking machines throughout the State, inspectors still find dairymen who are careless in cleansing their machines. A machine, when not properly attended to, is a certain source of contamination of milk and cream, and this contamination cannot always be readily detected at the factory. If, as often happens, tainted milk or cream is mixed with purer milk or cream, the good does not improve the inferior—the effect is always in the opposite direction. Therefore, it is obvious that all dairymen, without exception, should keep their milking utensils and machines thoroughly clean.

Odd cases have come under notice of dairymen using high-smelling animal ointments on sore teats of cows. An occasional one has been found using it on his hands when milking. These practices taint the milk, and an objectionable odour follows through the cream stage into the resultant butter. The use of ointments containing carbolic and other coal tar derivatives in this manner should be absolutely discontinued. There are other effective remedies, such as zinc or boracic ointments, obtainable from any chemist; these have no objectionable odour and do not affect the milk, cream, or butter.

A few other dairymen have been discovered who use cleansing material bearing a fanciful name. The directions for use indicate that it is necessary after using it to scald the vessels finally. When this is not done, a film is left on the separator discs, on the insides of buckets, and of milk and cream cans. It is suspected that the seller represents to purchasers that its use obviates the necessity for boiling water or steam. He panders to their cupidity. His main concern appears to be to effect

sales. It has been discovered that the output of at least two butter factories in the State has been detrimentally affected through the use of this cleanser on a few dairy farms, and when the dairymen were induced to discontinue using it, the trouble ceased. Experiments have proved that, unless used very carefully, it affects milk, cream, and butter detrimentally.

How great the necessity for care in choosing cleansers is indicated by the fact that at one time there was on the market an article which, when used a few times on buckets and cans, removed all the tin with which they were coated, and so ruined them for dairy use.

It is safer to follow the old-fashioned practice with dairy utensils. They should be washed in hot water to which some washing soda has been added, and a scrubbing brush used on them; finally, they should be scalded or steamed. For cleansing the parts of milking machines, caustic soda should be added to the hot water, and they should be finished with scalding water. The use of a cloth to dry the vessels is unnecessary; it is usually harmful, as cloths are seldom as clean and sweet as they should be.

Fortunately, only few now remain at fault; yet these few are far too many, and they should immediately resolve that practices which have such far-reaching evil results will be discontinued.

Care in the Factory.

It may be well just now to give a word in season to butter factory directors and managers. Some managers were still overhauling their plant a few weeks ago even though export had commenced.

A little time since, butter was received which was not quite satisfactory, and upon investigation it was found that, at some of the factories from which it had come, the work of relining the pasteurizing vats was being carried out when the butter was being made. A case came under notice in which new cream pipes were being installed, while other factories were visited at which a general overhaul of plant was taking place. In all of these instances, operations were being carried on at a disadvantage, and consequently, the control of the quality of the product was temporarily disorganized.

The proper time at which to do this work is in the slack period of the year. It should have been considered at the end of last season, over six months ago, and completed during the months of May and June, or, at latest, by the middle of July. If this had been done, there would have been time to attend to the final touches and adjustments, and have everything in readiness at the commencement of the season.

Before next season, a number of factories will require to be re-built. Now is the time to have plans prepared. It will take a couple of months to consider them, get approval, and receive tenders; and even if started soon, the contractors will have no time to spare in completing the buildings and installing the plant before the commencement of next season. If left too late, loss will inevitably result.

There are other headings under which amendment is necessary. This season, an abnormal quantity of butter, when examined for export, was found to be short in weight. It will be remembered that at the

commencement of the season, it was agreed that a 2-oz. margin should be packed in every 56-lb. box. At a few factories in the State, the scales used do not weigh to the ounce; this should not continue. Unless the butter is very well made, a 2-oz. margin is not sufficient to ensure full weight when it is eight weeks old.

Again, it has been found in some instances that more alleged choicest quality butter has been turned out than the amount of choicest cream purchased would have produced. Under the Dairy Produce Act, all milk and cream must be graded by a certificated grader and paid for accordingly, on a differential basis. Odd managers evidently think that they secure an advantage for their company by including some first-grade cream with their choicest. Such a practice is always accompanied by risk and should not be adopted. It may be stated that the Department should prosecute such delinquents, but in order to do so successfully, transgressions have to be submitted to the Court, and specific details must be produced. The requisite definite particulars are difficult to obtain.

The most successful managers—and they form the great majority —regard the Dairy Produce Act and Regulations as their Bible. They adopt the requirements provided, and do not take risks. There should be no exceptions, as it is in the best interests of every factory manager to do what is right. The time is overdue for the few concerned to amend their practices, particularly in the matter just referred to.

The Sellers' Part.

Perhaps it would not be right to wholly blame dairymen, directors, or managers: the sellers of butter are largely responsible for some manufacturers "sailing close to the wind." Very frequently as good prices are obtained for a medium quality of butter as for the best. Manufacturers get to know this, and produce an article that is by no means as choice as it should be.

When the proposal to adopt the "Kangaroo" Brand was made, I pointed out that if all butter bearing this brand were to be sold at the one price, there was a danger of butter factory managers making butter which would score the minimum, or just above the minimum number of points to merit the brand. I am sorry to say that the tendency in this direction has become pronounced in some instances, and mediocrity is the result. Every manager should constantly endeavour to improve. If he makes a 93-point butter today, he should try to turn out a 94-point butter tomorrow, and so on, until the highest standard possible is achieved.

If any brand of Victorian butter does not come up to expectations, unfortunately the harm done is not confined to the factory responsible, but extends to the whole State and, it may be said the Commonwealth.

Conclusion.

To put up the best butter, vigilance is required in every operation in the factory, as well as care in separating the milk and keeping the cream free from taint till it goes into the churn. The maker is not

always to blame for turning out a product that is not first class. The care of milk and cream, the cleanliness of utensils, prevention of contamination, delivery to the factory in good condition—all these claim the dairyman's attention. The manufacturer has his share of duties which claim constant and skilled attention. The seller would be well-advised to adopt marketing methods that would ensure continuous enthusiasm on the part of those engaged in production and manufacture. This can be done by selling every parcel on its merits. As long as an equal price, or prices almost equal, are given for choice butter and for butter below that standard, there is little incentive to the production of the best, and the task of trying to make a general improvement will remain a difficult one.

Uniformly high quality is the key to good marketing of produce and the securing of best prices.

POULTRY FEEDING TESTS.

EXPERIMENTS AT WERRIBEE.

By W. C. Rugg, Chief Poultry Expert.

During the year 1928-29 several experiments were carried out in the poultry section of the State Research Farm at Werribee. One of these was designed with a view to ascertaining whether by the addition of minerals to the feed the texture of the shells of eggs could be strengthened.

The number of eggs offered for export which has to be rejected is increasing each year. A very large percentage of these rejections is due to the shells being stained or dirty. For those who suffer on this account there need be little sympathy, for during the last five years warnings have been given by the Government graders, by exporters and by departmental officers that, owing to the risk of mould, only eggs spotlessly clean in shell would be accepted for export. There is, however, unfortunately a growing number of rejections because of the shells, as well as because of a deficiency in internal quality, a deficiency due chiefly to enlarged air cells and weak albumen (watery whites).

Enlarged Air Cells and Weak Albumen.

Enlarged air cells usually indicate staleness, while watery whites are often caused by exposure to warm temperatures or to long storage. But at times eggs only a couple of days old show this fault.

Such defects as those mentioned are not peculiar to Victoria; they have been noticed also in the other States. In America and England they have become so common as to cause considerable loss to producers.

Although investigational work has been carried out in various parts of the world no reason can be assigned for the troubles. Officers of the Victorian Department of Agriculture have for the past three years

been carrying on experiments which it was hoped would lead to a solution of the problems, but so far without success. Mr. W. R. Jewell, Chemist to the Department, is making inquiry into the possible causes of watery white, and it is hoped that before next export season he may be able to suggest a plan of investigational work.

Thin Shells.

The experiment made at Werribee to try to determine whether the strength of the shell of eggs could be improved consisted of the addition of a mineral mixture (which contained potassium iodide) to the ordinary food. The mineral mixture was one suggested by Professor Frank Ewart Corrie, B.Sc., and was made up of 50 lb. bone flour, 23 lb. ground lime, 20 lb. common salt, 5 lb. sulphur, 2 lb. oxide of iron, and 4 oz. potassium iodide.

Front of Experimental Feed Shed, State Research Farm, Werribee.
The shed consists of 10 pens, each of which accommodates 50 birds.

The test, which was conducted by Mr. A. G. Clark, poultry foreman, was for a period of twelve months from the 1st April, 1928, and the birds used were 300 White Leghorn pullets, as even as possible in quality, weight, and age. They were divided into six pens of 50 birds each, and were all kept under one roof and under similar conditions as to space. They were not allowed out, and so were unable to get any food except that fed to them. Pens 1, 2, 3, and 6 were fed dry mash in hoppers available at all times; grain was fed them in the litter in the evening; green stuff and shell grit were also given.

Pen No. 1 received 3 per cent. of the mineral mixture in the mash.
Pen No. 2 received 5 per cent. of the mineral mixture in the mash.
Pen No. 3 received ¾ oz. potassium iodide to 100 lb. mash.
Pen No. 6 received similar feed to Pens No. 1, 2, and 3, but was fed no mineral mixture.
Pen No. 4 was fed dry mash without grain or mineral.
Pen No. 5 was fed grain without mash or mineral.

The table on page 9 shows the average amount of food consumed per bird, the average egg production and the average weights of the birds on 1st April, 1928, and on 31st March, 1929.

Mr. H. F. Clinton measured a number of the shells of the eggs laid in these six pens, and has prepared the following report and tables:—

In determining shell thickness all measurements were made, without the shell membranes, on the medial or central portion of the shell. It was considered that the mean of a number of readings taken in this region would yield a figure suitable for comparative purposes.

The readings do not represent an absolute measure of the thickness of shell, owing to the fact that the diameter of the micrometer spindle was 2.5 mm., as well as to the curvature of the shells, with the consequence that the measurements are not quite so great as stated. This, however, may be taken as constant for all practical purposes, and for comparative work such as this need not be taken into account—the error being approximately the same for every measurement carried out. It must be remembered that any measurements made will vary according to the diameter of the spindle or anvil of the micrometer used.

For convenience all measurements are given in millimetres. As 1 inch is equivalent to 25.4 millimetres the readings may be converted to inches by dividing by 25.4.

Examination of a large number of eggs in previous experiments, and measurements of them with the micrometer referred to, showed that eggs with shells of less than 0.32 millimetres (0.0126 inch) in thickness were too frail to be handled satisfactorily.

TABLE A.—MEASUREMENTS OF EGGS (THICKNESS OF SHELL).
(Made on 28th March, 1929.)

PEN NO. 1.—DRY MASH AND GRAIN. 3 per cent. Mineral Mixture.	PEN NO. 4.—DRY MASH ONLY.
0·32 mm.	0·31 mm.
0·375 ,,	0·31 ,,
0·38 ,,	0·34 ,,
0·31 ,,	0·35 ,,
0·37 ,,	0·345 ,,
PEN NO. 2.—DRY MASH AND GRAIN. 5 per cent. Mineral Mixture.	**PEN NO. 5.—GRAIN ONLY.**
0·36 mm.	0·29 mm.
0·35 ,,	0·36 ,,
0·32 ,,	0·43 ,,
0·35 ,,	0·37 ,,
0·34 ,,	0·295 ,,
	0·39 ,,
PEN NO. 3.—DRY MASH AND GRAIN. Potassium Iodide.	**PEN NO. 6.—DRY MASH AND GRAIN.**
0·345 mm.	0·36 mm.
0·36 ,,	0·30 ,,
0·31 ,,	0·36 ,,
0·37 ,,	0·35 ,,
0·34 ,,	0·35 ,,
0·35 ,,	

Interior of Experimental Feed Shed, State Research Farm, Werribee.
Fitted with automatic water supply controlled by a ball tap. Birds roost over a manure pit partly shown on right.

Table B.—Measurements of Eggs (Thickness of Shell).
(Made on 21st June, 1929.)

Pen No. 1.—Dry Mash and Grain. 3 per cent. Mineral Mixture.	Pen No. 4.—Dry Mash only.
0·375 mm.	0·40 mm.
0·355 ,,	0·31 ,,
0·35 ,,	0·37 ,,
0·41 ,,	0·275 ,,
0·32 ,,	0·23 ,,
0·39 ,,	
Pen No. 2.—Dry Mash and Grain. 5 per cent. Mineral Mixture.	**Pen No. 5.—Grain only.**
0·365 mm.	0·39 mm.
0·33 ,,	0·415 ,,
0·225 ,,	0·38 ,,
0·33 ,,	0·325 ,,
0·315 ,,	0·40 ,,
0·345 ,,	0·42 ,,
Pen No. 3.—Dry Mash and Grain. Potassium Iodide.	**Pen No. 6.—Dry Mash and Grain.**
0·34 mm.	0·37 mm.
0·39 ,,	0·31 ,,
0·315 ,,	0·355 ,,
0·35 ,,	0·38 ,,
0·38 ,,	0·41 ,,
0·33 ,,	0·35 ,,

As no conclusion could be drawn from the results obtained, it was decided that the test should be continued for another year with Pens Nos. 1, 3, and 6.

Other Feeding Experiments.

An experiment was made to test whether a greater number of eggs could be obtained from birds, if in addition to wet mash they were given dry mash as well. Two pens of Leghorns (Pens Nos. 7 and 8) were used. Fifty birds were placed in each pen, and all of them were fed wet mash in the morning, and grain was fed them in their litter at night. The birds in Pen No. 7 had, in addition, a dry mash hopper always available, and they were given supplies of shell grit and charcoal; they were also allowed some green stuff at midday and after the grain feed at night. The table on page 9 shows the average consumption of food per bird, the average number of eggs laid, and the average weights of the bird at the beginning and end of the test.

Although the birds in Pen No. 7 consumed over 9 lb. more wet mash in addition to 10 lb. dry mash, they lost an average of nearly 13½ oz. in weight per bird, but laid on an average eleven eggs more per bird.

Another experiment carried out was one to try if satisfactory results could be obtained from feeding lucerne chaff in dry mash.

Two pens (Nos. 9 and 10) of Leghorns were used; there were 50 birds in each pen.

The wet mash of the birds in No. 9 pen consisted of 10 per cent. lucerne chaff, while a similar percentage was included in the dry mash given the birds in No. 10 pen. No. 10 pen consumed slightly less food and laid eighteen eggs more per bird than No. 9 pen, but the birds in No. 10 pen lost on an average 3½ oz. more in weight than did those in No. 9 pen. The table below shows the average consumption of food per bird, the average number of eggs and the average weights of the birds.

TABLE I.—SHOWING RESULTS FROM VARIOUS FEEDING TESTS.

(Conducted at the State Research Farm, Werribee, 1928-29.)

Pen.	Food Given.	Consumption per Bird.			Eggs.	Weight of Birds.		
		Wet Mash.	Dry Mash.	Grain.		Before.	After.	Difference.
						lb. oz.	lb. oz.	oz.
1	Dry Mash .. Mineral 3 per cent. Grain	..	42·0	49·6	195·0	3 15	3 14	−1
2	Dry Mash .. Mineral 5 per cent. Grain	..	33·6	49·6	181·3	3 14	4 0	+2
3	Dry Mash .. Pot. Iodide .. Grain	..	27·7	49·6	185·4	3 14	3 10½	−3½
4	Dry Mash only ..	..	84·4	..	163·3	3 10½	3 9	−1½
5	Grain only ..	..	..	59·8	146·4	3 7½	3 10½	+3
6	Dry Mash .. Grain	..	27·9	49·6	195·3	3 15	3 8½	−6½
7	Wet Mash .. Dry Mash .. Grain	49·5	10·2	49·6	185·9	4 3	3 5½	−13½
8	Wet Mash .. Grain	40·0	..	49·6	174·9	3 12½	3 7¾	−4¾
9	Wet Mash .. Lucerne Chaff .. Grain	40·0	..	49·6	172·4	3 11¾	3 7½	−4¼
10	Dry Mash .. Lucerne Chaff .. Grain	..	37·3	49·6	190·9	3 14	3 6¼	−7¾

MIGRATORY BEE-KEEPING.

By J. S. Eagland, Apiary Inspector.

The term migratory bee-keeping is generally applied to the practice of moving apiaries from one district where blossom is failing to another where it is plentiful. In an unfavorable season the orchardist cannot shift his orchard to a favoured locality, nor the farmer transfer his farm elsewhere, but that is virtually what the apiarist does. The hives of bees represent his producing assets, and it is not at all a formidable task to move an apiary of 200 hives from one district to another; distances of up to 300 miles are sometimes covered.

It is usually found that practically all our good honey-producing areas have their "on" and their "off" seasons, due to most of the native flora being biennial or perennial in its flowering habits; also to a variation in time of blooming of the different varieties. It may happen that a district may enjoy prosperous conditions for a time, and these may be succeeded by a period entirely devoid of any honey-producing bloom; this may again be followed by one of plenty; but the lean time intervening would so reduce the bees in numbers, that the total return of honey would be seriously affected.

In circumstances such as these, returns can be considerably increased by temporarily moving an apiary to more favoured country so as to bridge the gap and maintain the hive at maximum producing strength.

Perhaps the district where this practice is commonest is in the area between Maryborough and the northern Grampians. Every second year in this area there is an almost complete lack of blossom during December, January, and February, while at the same time the red gum country round Dunkeld and Cavendish is producing large quantities of honey. From this circumstance the practice of whole districts of apiarists migrating to the red gum country has gradually developed. Maybe one could pass through some of this part in November and not see a hive anywhere, yet by December or January as many as 10,000 may have been brought into the district. By March possibly the country is once more bare of bees, but in that intervening few weeks it is likely that bees have gathered there as much as 15,000 60-lb. tins, or, roughly, 400 tons of honey, worth approximately £12,000.

Again, the irrigation area at Werribee is a good honey-producing area during January and February of each year, but the bees must be moved away from there for autumn and spring.

Of course, in migratory bee-farming one must always consider the question of costs and repairs. It has generally been found that actual transport cost of an apiary for 100 miles is in the region of 4s. per hive, but in addition to this one must reckon the cost of locating a favorable site, and this may involve many miles of travelling before a final selection is made. Further, extra labour will be required; there will be wear and tear on plant and equipment, to all of which may be added the extra cost (not to mention the inconvenience) to the apiarist in living away from home.

Selection of Site All-Important.

The selection of a site is most important, for if the one chosen be not satisfactory, no advantages elsewhere can give a return of honey sufficient to justify the labour and expense involved in a second change. This choice of sites is perhaps the weakest point in the present system of migratory work; for, while the apiarist can to a great extent control the work of the bees, and make the operating of his plant efficient, the secretion of nectar is governed by natural laws of which to-day very little is known, and over which he has no control. I have in some places seen good prospects fade and become total failures, while in others where the prospects could only have been classed as fair, there have been really excellent returns. The final decision must therefore be governed by the knowledge of the apiarist himself, or by the advice of those who have studied the blossoming of the local flora, and till science can come to our aid in determining the various conditions which are instrumental in causing the secretion of nectar, site selection will remain our biggest gamble.

Advantages and Disadvantages of Transferring Hives.

If a check be kept over a number of years I think it will be found that the total cost involved for each move will be in the neighbourhood of 8s. per hive, or £80 for an apiary of 200 colonies. Of course, in the case of moving an apiary to another site temporarily for building up purposes, the costs are probably much less, 4s. per hive being ample to cover the total cost of a move and return, for in such a case no plant or extra equipment need be taken. In spite of the heavy cost involved, migratory bee-farming is now practised by practically all commercial apiarists, mainly on account of the much greater return secured, but also because of the fact that, with the continuous depletion of timber, there are very few sites now available which will maintain a commercial apiary throughout the year. A comparison of the receipts from the apiary that is not moved and one worked on the migratory system shows that the total returns from the latter are generally about doubled. The annual yield from a stationary apiary is from about 20 to 80 lb., while from one that is moved from a district where there is a lack of bloom to a more favorable district, the annual yield is about 150 or 160 lb.

While returns such as this justify a certain amount of moving, there is no doubt that the practice can easily be overdone, and unless exceptionally good returns are secured, it may be found at the end of the season that, instead of a profit, there is actually a loss. One case which recently came under my notice was that of an apiarist, who by continuous moving was able to keep his bees on a honey-flow for eleven months of the year, and yet showed only a slight profit, owing to his transport costs for the year having amounted to over £1,000.

The apiarists who are now most successful are those who have carefully selected their home sites, and transfer their hives only when another district shows exceptional promise, or in the event of a total failure of bloom in their home area.

The Migratory Bee—Farmer's Equipment.

An apiarist adopting the migratory system will find many alterations in plant necessary. It is not possible to transfer some of the hive parts; for instance, it is impracticable to pack in a load the long floorboards provided for alighting of the bees. The best practice in the case of hives likely to be transferred is to allow the floorboards to project only ½ inch beyond the front of the hive body itself. The nailing of the floorboard to the bottom of the hive body is becoming more general, and while this has some disadvantages, there is so much to be said in its favour, that it can be strongly recommended.

In the hive bodies nothing less than ⅞-inch timber should be used; timber of a less thickness will not stand the strain of transport for any great length of time. Hive covers should be as neat and compact as possible to facilitate the packing of the load. Wire screens are, of course, necessary to replace covers on all hives while the bees are confined during moving, otherwise they would all suffocate for want of air. Migratory methods have virtually sounded the death-knell of the loose hanging frame, for it is impossible to pack them so that they will not move and crush the bees.

The frames now in use are practically all self-spacing, Hoffman, the Victorian pattern, being most used. Frames of this type have spacing shoulders which keep them the correct distance apart, and in packing, hedging to one side only is sufficient to prevent all movement. It is essential that all screens, hive bodies, floorboards, and entrance blocks fit together perfectly and be in good order, as nothing is more annoying than to confine the bees in readiness for loading, and then find some escaping from various cracks and holes in the hive.

In addition to the alteration to the hive parts, it is necessary to have a portable extracting outfit of some sort, and for this work a light room built in sections is much preferable to the tents so commonly in use, for it is impossible to prevent bees coming into the tent and so becoming a nuisance while extracting is going on. The extracting plant itself is the same as that used at the home apiary, but the parts must be laid out in such a way as to facilitate rapid setting up and dismantling.

Method of Transport.

In moving hives from one site to another, the points most necessary to success are sufficient ventilation and speed of transport, as it is fatal to confine bees for any great length of time during warm weather. For this reason the practice of using all road transport, as against road and rail, has become more popular. In deciding which practice to follow, it must be remembered that, while transport by road is much faster, with less risk in warm weather, rail transport can be adopted at about half the cost, and in cool weather or where the colonies are weak, with very little more risk. Further, on rails it is possible to give the bees more room in each hive by adding an empty super, as space in a truck is not limited as it is in a motor vehicle.

I would point out that in transferring bees by rail there would be much less risk from overheating if greater use of the syringe spray, preferably with iced water, were made.

However, the choice of methods must be governed by each individual move to be made, in some cases road, and in others rail transport being the more economical proposition.

In packing bees prior to moving, care is necessary to ensure that they are not overcrowded by the removal in too many cases of the super, so as to get more hives into each load.

In rail transport particularly, leaky hives must be guarded against, for the apiarist must remember that while he is quite used to stings, other people are not.

The Railway Department, realizing the necessity for speedy transport, will now attach trucks of bees to the first available passenger train, and leaky hives represent a direct menace to both staff and passengers, and apiarists cannot expect the concession of speedy traffic to be continued if it is made difficult by their carelessness.

Unfortunately many apiarists have in the past been careless in this respect, with the result that bees are very unpopular freight at some country stations, and this feeling of hostility does not make for the best interests of the industry.

In road transport, the hives can usually be closed and loaded in the evening, and by travelling all night, they can be landed on the fresh site and unloaded before daylight. This is the advantage which has made for the popularity of road transport.

Temporary Sites on Forest Reserves.

In view of the great increase during recent years in the number of migrating apiarists, perhaps I should mention here that an arrangement has recently been made by the Forests Commission whereby, if the district forest officer approves, an apiarist may secure a temporary site in a forest reservation. The period for which the site will be available is three months, and the fee is £1.

VICTORIAN EXPORT APPLE SEASON, 1930.

By J. M. Ward, Superintendent of Horticulture.

The apple export season is almost with us. Unlike the 1929 season, which was a very light one, the coming season will to some extent resemble the export year of 1928, when a record shipment from Victoria of approximately 987,000 cases of apples and pears was made to the United Kingdom and Europe; in addition, quantities were exported to other countries.

During the forthcoming season, it is expected that over 900,000 cases of apples and pears will be exported; indeed, shipping space for over 900,000 cases is already booked, and from the latest information

obtainable there is every indication that the estimate will be realized, even in spite of frosts, hail-storms, and unfavorable weather conditions.

I am fully aware of the damage done in certain localities by frost, in the first place, and later on by a severe hail-storm; on top of this there has been a considerable amount of wet weather which has greatly favoured the development of black spot; thus the quantity of "standard" grade apples is certain to be somewhat reduced.

It should, however, be remembered that in 1928 we had the record crop of nearly 4,000,000 cases, 3,000,000 of which were marketed within Australia. This was in competition with heavy crops in Tasmania and South Australia, and growers in all the States (except in Western Australia) obtained low prices. The prices obtained in England that year were also low. This season, however, growers have realized that it is necessary to export a large quantity, because of the smaller crop in the United States and Canada; further, the crops in Tasmania and South Australia, as well as in New South Wales, will again be fairly heavy, and therefore the competition for the sale of apples within the States will be very keen.

The estimated export quantity will, of course, have to be reviewed again, and possibly revised; but, at the moment, it does not appear that the number quoted will be greatly reduced.

Growers and apple exporters are most anxious to know the official attitude towards the February shipments. Most fruit-growers know that complaints have come forward at various periods concerning immature fruit sent from Australia to the United Kingdom, and these complaints apply as much to our State as to any other part of the Commonwealth. I am also fully aware that more complaints have been made about apples arriving in an over-ripe or wasty condition; so between immature and over-ripe apples, or rather complaints about them, we appear to be between the "devil" and the "deep blue sea." These detrimental reports regarding the condition in which some of our fruit arrives in England show that the complaints, or rather continued complaints, are not without reason; therefore it is the duty of every one engaged in the apple export industry to do their very utmost to improve the situation.

The Degree of Maturity.

Regarding the maturity of apples, I would like to point out that during the present season close inspection will be made for apples that are picked at too early a stage for shipment. Unfortunately, at the present moment we are not in a position to lay down a maturity standard for each apple district; and we all know that districts differ considerably in so far as early or late maturity is concerned. There are, of course, certain methods of testing apples for their degree of maturity, but apart from the "ground" colour of the skin I am not aware of any simple and effective method that can be put into practice by the grower during a particularly busy season.

In these circumstances, growers will this year have to exercise judgment when picking their apples to make sure that the fruit is sufficiently mature for export purposes. Every experienced grower has sufficient knowledge of apples to be able to judge the condition of

the fruit. For instance, no grower would think of picking Yates in March for export; and in the southern districts Jonathans should not be picked for shipment in February steamers. When consignments are submitted for inspection a close examination will be made, and, if considered to be in an unripe condition, they will be rejected. I therefore strongly appeal to growers to use their good judgment when picking the fruit, and thus give the inspectors no opportunity to make rejections on the ground of immaturity.

Research workers in a number of apple-producing countries are making investigations into the maturity question. Officials of the Victorian Department will do likewise during the coming season, and it is to be hoped that in the near future such detailed information will be available that a maturity standard for every district—not necessarily a standard to be enforced by Government Regulations, but one that growers will adopt for economic reasons.

Grade Standards Must be Observed.

So far as inspection under the Commerce Act Regulations is concerned, I desire to inform growers that a very strict inspection will be made, and the grade standards rigidly enforced. If any apples are found to be not of the size represented on the cases they will be rejected.

It often happens that growers brand a case as containing 2¼-in. apples, notwithstanding that many, perhaps most, of the fruits are below this size. In cases bearing the 2¾-in. brand some growers will put apples over and above this size. This must not be done. Mixing of sizes is not allowed, and fruit so packed will be rejected by inspectors.

The Quality of the Case.

The quality of the case is another factor that must be taken into consideration. During the 1928 apple export season certain growers—in a number of instances intelligent growers, from whom better things were expected—packed magnificent apples in very poor quality cases, which were not fit for anything but picking-boxes or firewood. It was indeed extraordinary that people should put most highly coloured apples into dirty looking ill-made cases, and one might have been pardoned for thinking the high colour was due to the fruit blushing at being placed in such a package.

Whilst we were fairly strict in rejecting these low quality cases in 1928, we will be still more strict during the coming season. I am well aware that during the rush of work in a busy season growers are forced to make into cases such timber as sawmillers send along. If, however, the miller or supplier of case timber were informed that nothing but suitable and presentable timber would be accepted, better quality material, well cut, would then be supplied. If the grower is prepared to accept and pay for poor material, the miller will supply it. It is the grower, however, who pays the piper, and his loss owing to the use of bad cases may be very severe.

Slack Pack.

Another matter that should be mentioned is the slack packs. Invariably this is due to what is known as the "flat pack," that is, the apples are packed with stalk end down. It is rarely that cases of apples so packed have a presentable appearance when opened at their destination. The pack is either very slack, or the case is over-filled and the apples bruised. Fortunately such packing is done only in one or two old-fashioned districts by a comparatively few growers, who cannot be induced to try to improve their methods.

Packing of Hot Fruit to be Guarded Against.

An important matter that should receive attention from every grower is the question of packing what may be termed warm or hot fruit. Very often the fruit is warm when picked, then packed into hot cases, before giving it a chance to cool down. After packing, the cases are put into a stack in a hot shed, and later into a railway truck, the inside temperature of which may be anything up to 100 deg. F. upon its arrival at the ship's side. During the 1928 export season the temperature of many individual apples was taken at Port Melbourne as soon as they were taken out of the louvre trucks, and it was found that in some instances it was as high as 85 deg. F.; a temperature of 70 deg. F. was quite common. It goes without saying that there is very little hope of such apples arriving in good condition at the other end of the world. It is most advisable to have the fruit picked some time before packing, so that it may have an opportunity to cool off. If this were done much loss would be avoided.

At this point it may be interesting to mention the quantity rejected during the export season of 1928. Of a total of 906,469 cases of apples offered for shipment to England and Europe, 21,738 were rejected at the ship's side by the inspectors. In addition, rejections were made at country centres. The details of the ship's side rejections are as follow:—4,833 cases on account of bitter pit, 1,489 for codling moth, 796 for immaturity, 8,423 as being too far advanced and overripe, 668 for black spot, and a further 3,267 for various other reasons, such as poor quality, discoloured cases, newspaper lining, slack packing, wrong branding, cases broken at ship's side, bad grading, skin blemishes, San Jose and mussel scales, wrong variety mark, and other odds and ends.

In conclusion, I desire to point out that although I have stressed a number of faults of growers with a view to bringing about a further improvement in the grading, packing, and general get up of our fruit, it is only right for me to state that a large majority of Victorian apple and pear growers put their fruit up in a most desirable and attractive manner; unfortunately, a few do not do so, and this helps to spoil the reputation of all our growers; for this reason all should try to make their export packs as excellent as they can.

REGISTERED FERTILIZERS AND UNIT VALUES FOR THE YEAR 1930.

(Will. C. Robertson, Chemist.)

The Fertilizer Acts 1915 and 1928 impose certain obligations on the manufacturer or importer of, or dealer in artificial fertilizers.

Firstly.—The brand (with certain necessary details) must be registered annually at the office of the Director of Agriculture. Failure to comply with the Act in this respect renders the person who sells the unregistered fertilizer liable to a penalty of not less than Ten and not more than Fifty pounds for the first offence and for any subsequent offence to a penalty of anything from Fifty to One hundred pounds.

Secondly.—All parcels or packages (bags) containing artificial fertilizer must have a label affixed giving certain formal particulars, and (*a*) stating the number of net pounds of fertilizer in the parcel; and (*b*) guaranteeing the proportion per centum in which the fertilizer contains the fertilizing ingredient or ingredients, viz.:—Nitrogen and/or phosphoric acid and/or potash, and the respective forms in which they occur in the fertilizer.

Thirdly.—Upon the sale of any fertilizer, whether paid for at the time of sale or not, the vendor shall, at the time of sale or before delivery of the fertilizer or any part thereof, give to the purchaser an invoice certificate guaranteeing the composition of the fertilizer and stating (with other matter) the quantity of fertilizer comprised in the sale.

Failure to comply with this or the preceding clause renders the vendor of the fertilizer liable to prosecution. The object in each instance is to safeguard the interests of the farmer.

The Registration of Brands.

All manufacturers or importers of artificial fertilizers are required on or before the first day of November in each year to make application to the Director of Agriculture for the registration of a brand for each fertilizer which they propose to offer for sale during the ensuing year. Owing to the recent amalgamation of four of the oldest manufacturing firms, the number of brands of fertilizer registered this year naturally shows a marked reduction.

The application must state, in addition to other particulars, the percentage composition of the fertilizer as regards the three plant foods, viz.:—Nitrogen, phosphoric acid, and potash, specifying the forms in which they occur, and the retail price per ton, free on rail at the railway station nearest the factory, if manufactured in Victoria, or, if imported into Victoria, free on rail at Melbourne.

The Fertilizer Act provides that the Chemist of the Department of Agriculture shall calculate the average commercial unit values of the different fertilizing constituents, basing his calculations on the registered analyses and retail prices of all simple fertilizers. These unit values are to be used for computing the monetary value of all fertilizers during the year.

What is the Unit Value.

The unit value as so calculated is the commercial value of 1 per cent. of nitrogen, phosphoric acid or potash in its respective form in 1 ton of fertilizer.

Unit values provide the farmer with a useful method of obtaining the comparative values of various fertilizers or of various brands of one particular fertilizer.

It should be noted that "unit values" are the commercial values based on average ruling prices for simple fertilizers, and are not agricultural values standardized by the Department of Agriculture. As the composition and retail price of a fertilizer are in the hands of the manufacturers, it will be readily seen that the latter actually control the unit values.

The Method of Calculating the Monetary Value of a Fertilizer.

To obtain the comparative value of any artificial fertilizer on the market using current unit values, the buyer must have—

(*a*) the list of unit values for the year;
(*b*) the percentage composition of the fertilizer.

The value of the fertilizer per ton may then be obtained by multiplying the percentage of each fertilizing ingredient by its respective unit value.

The following examples will serve to illustrate:—

BASIC PHOSPHATE.

Guaranteed to contain—

	Per cent.		Unit value. s. d.		£ s. d.
Phosphoric acid, citrate soluble	15.5	×	4 3	=	3 5 10
Phosphoric acid, citrate insoluble	3.2	×	2 9	=	0 8 10
Calculated value per ton					£3 14 8

In this case the calculated value per ton of the fertilizer is low, and the reasons are (*a*) the non-fertilizing ingredient (lime) used in the admixture costs money, but as it has no unit value no allowance is made for it in the calculation, and (*b*) the fertilizer is a mixture, but when calculating values of compound fertilizers no allowance is made in unit values for the cost of mixing.

COMPLETE MANURE.

Guaranteed to contain—

	Per cent.		Unit value. s. d.		£ s. d.
Phosphoric acid, water soluble	10.94	×	4 5	=	2 8 4
Phosphoric acid, citrate soluble	2.22	×	5 6	=	0 12 3
Phosphoric acid, citrate insoluble	3.86	×	4 6	=	0 17 5
Nitrogen as ammonia	1.00	×	14 6	=	0 14 6
Nitrogen as blood, flesh, and bone	1.40	×	22 5	=	1 11 5
Potash as sulphate	5.00	×	6 0	=	1 10 0
Calculated value per ton					£7 13 11

The calculated value is low in this instance, because no allowance has been made for the cost of mixing.

Bonedust.

It will be noticed that the list of unit values provides separate values for nitrogen and phosphoric acid as fine and as coarse bone respectively. The Fertilizer Acts provide that the mechanical condition of a bonedust shall be guaranteed, together with the percentages of nitrogen and phosphoric acid; in addition, bonedust is defined as a fertilizer consisting only of disintegrated bones, and containing at least 19 per cent. of phosphoric acid. The fine material must be at least 50 per cent.

To calculate the value of a bonedust from the unit values, it is necessary, in the first place, to compute the percentages of phosphoric acid and nitrogen present as fine bone and coarse bone respectively. To do this multiply the percentage of the fertilizing ingredient by the percentage of fine bone and divide the result by 100. This will give the percentage as fine bone, which, when substracted from the total, will leave the percentage as coarse bone.

Take the case of a bonedust guaranteed to contain—

	Per cent.
Nitrogen	3.27.
Phosphoric acid	24.59.
Fine bone	69.40.
Coarse bone	30.60.

then 3.27% nitrogen x 69.4% fine bone ÷ 100 = 2.27% nitrogen as fine bone
and 3.27% — 2.27% = 1.00 nitrogen as coarse bone
24.59% phosphoric acid x 69.4 % fine bone ÷ 100 = 17.07% phosphoric acid as fine bone
and 24.59% total phosphoric acid — 17.07% phosphoric acid as fine bone = 7.52% phosphoric acid as coarse bone.

The calculation for commercial value is therefore—

Per cent.		Unit value.			£	s.	d.
2.27 nitrogen as fine bone	×	22	5	=	2	10	11
1.00 nitrogen as coarse bone	×	21	0	=	1	1	0
17.07 phosphoric acid as fine bone	×	5	0	=	4	5	4
7.52 phosphoric acid as coarse bone	×	4	6	=	1	13	10
Calculated value per ton				=	£9	11	1

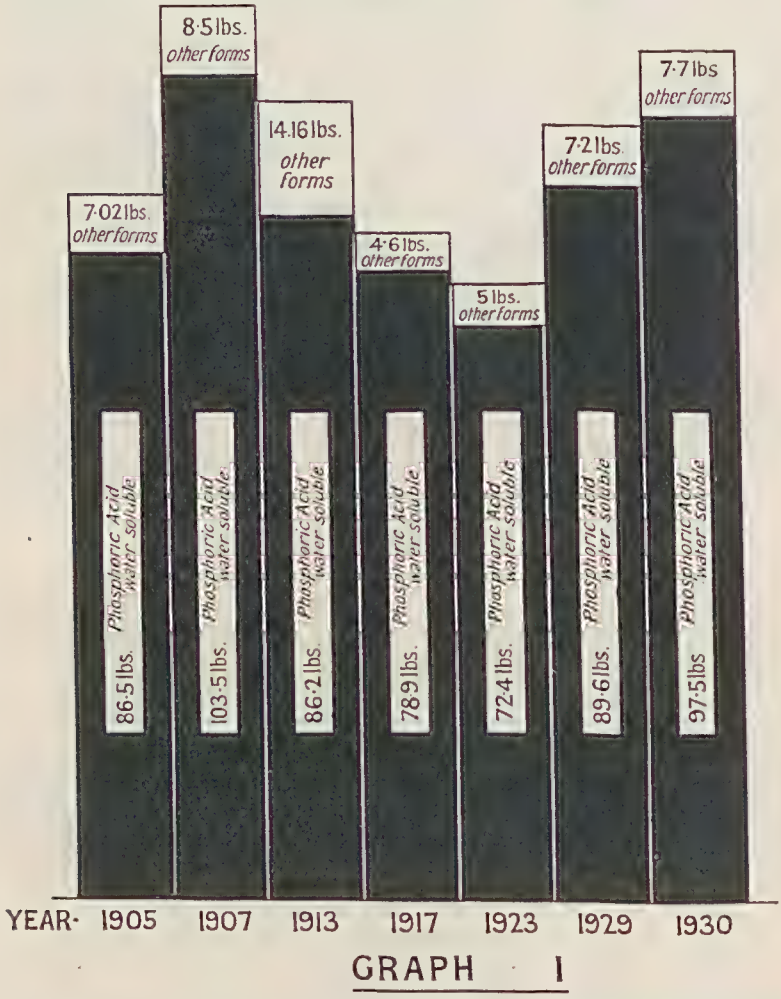
A farmer in North-Eastern Victoria should not order a fertilizer from works in the Western District, as the freight in this case would be, approximately, double that on a fertilizer bought in Melbourne. It is, therefore, important to remember that the retail price per ton quoted is free on rail at the railway station nearest to the factory.

A REVIEW.

Superphosphate.

Approximately 90 per cent. of the artificial fertilizer used in Victoria consists of superphosphate, either neat or in admixture. The increased consumption of this fertilizer in Victoria (as well as in the Riverina) reads like a fairy tale. For every ton of "super" used by the Victorian farmer in 1901 more than 10 tons are being used to-day and the end is not yet, for the acceleration in consumption due to top-dressing of pastures in recent years is moving the figures along by leaps and bounds. The production and use of 300,000 tons per annum in Victoria is already in view; in 1901 we used less than 25,000 tons of the fertilizer!

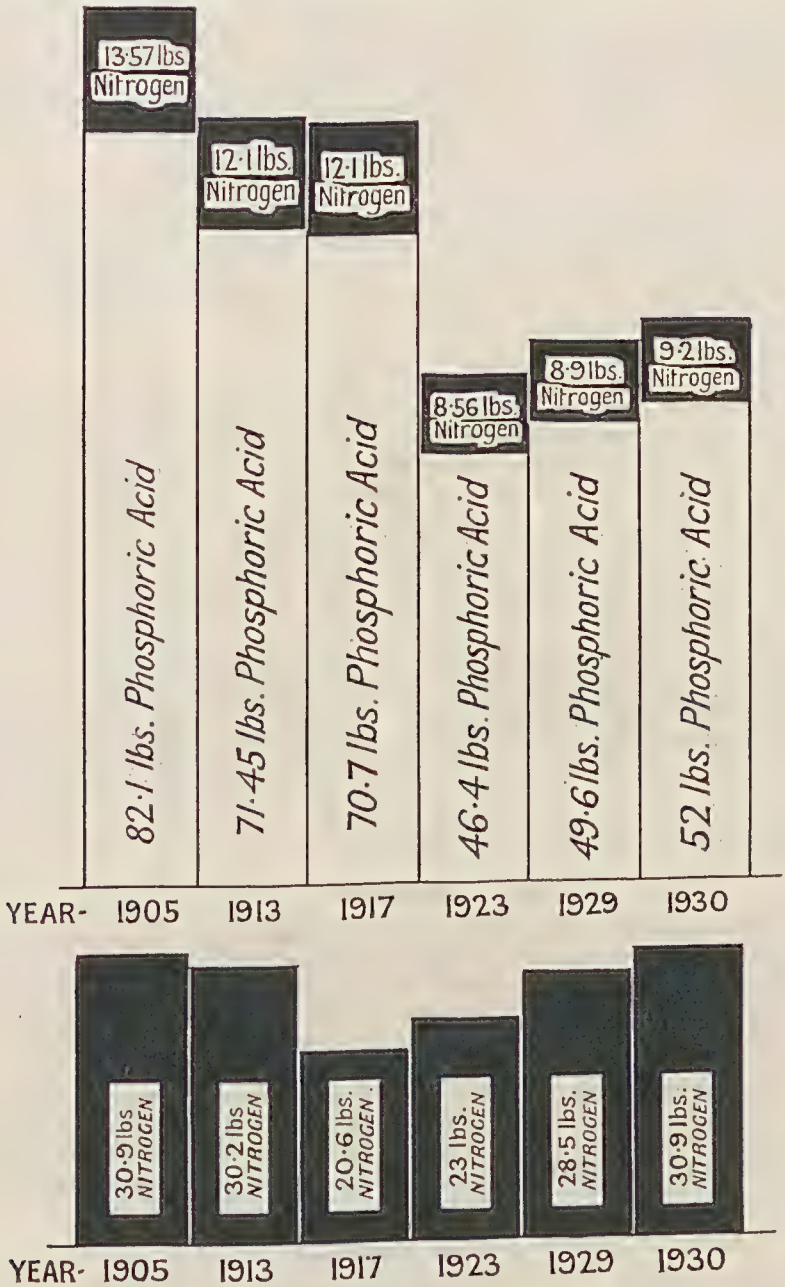
A review of the annual price of superphosphate in Victoria during the past 25 years discloses the fact that phosphoric acid in the form of "super" is, approximately, 12½ per cent. cheaper to-day than it was in 1905. Still more satisfactory is it to find that "super" (as regards phosphoric acid) was dearer in the pre-war year of 1913 than the price charged the farmer during the current season (1930).



GRAPH I

Showing the number of pounds of Phosphoric Acid received for every twenty shillings expended on superphosphate during the period 1905–1930.

This is an interesting and excellent record, especially when compared with the pre-war and current prices of other commodities essential to the life and welfare of the community. "Super" plays an important part in the production of farm produce, such as wheat, wool, beef, butter, milk, &c., and although there is no gainsaying the fact that the average prices of these commodities are much higher at present than they were in 1913, the price of superphosphate cannot be held responsible.



GRAPH 2

Top Graph shows the number of pounds of Nitrogen and Phosphoric Acid received for every twenty shillings expended on bonedust during the period 1905–1930.

Bottom Graph shows the number of pounds of Nitrogen, as Ammonia, received for every twenty shillings expended on Sulphate of Ammonia during the period 1905–1930.

Graph 1, on page 20, shows for certain selected years the number of pounds of phosphoric acid (in the three forms) received for every Twenty shillings expended in the purchase of "super" during stated years and explains itself. It will be noticed that this fertilizer was cheaper in 1907 than in any year before or since, the reason for which is partly explained by the intense competition at the time.

The price of superphosphate per ton in England is £3 to £3 6s. These figures are misleading in that the British superphosphate contains 13.75 to 16 per cent. water soluble phosphoric acid, whereas the grades in use in Victoria contain 20.5 to 22 per cent. Computed on an equal basis the price of superphosphate is, approximately, 8s. per ton cheaper in England than in Australia.

Sulphate of Ammonia.

Less than 10 years ago Victoria produced sulphate of ammonia in excess of the demand, the surplus being exported; whereas at the moment we use every ton manufactured locally, and to meet requirements an appreciable tonnage is being imported from England.

A glance at Graph 2, on page 21, which sets out the number of pounds of ammoniacal nitrogen received by the farmer for the expenditure of Twenty shillings on sulphate of ammonia during stated years—1905-1930 inclusive—shows that the price of this fertilizer is back to the pre-war figure.

However, the price of sulphate of ammonia is still over 25 per cent. dearer in Victoria than it is in England. This is probably due mainly to the higher price of the coal from which the local article is obtained as a by-product, and to freight, &c., on imported material. The use of nitrogenous fertilizers is rapidly increasing, and should future sales increase as they have done in recent years, we may witness the installation of an "air nitrogen" plant for the manufacture of ammonium sulphate with a resultant drop in price.

Bonedust.

On a further reference to Graph 2, page 21, it will be noted that bonedust is a comparatively dear fertilizer, and whilst the price has shown a small decline in recent years, the demand on the raw material for stock licks is increasing, and this, combined with other factors, will in all probability hold the present price, which is greatly in excess of that current 25 years ago.

The price of bonedust in Victoria approximates that charged for bonemeal in England. The analysis in each case is practically identical. Bonemeal made from selected bones, and subjected to increased steam pressure prior to grinding, commands a much higher figure for use as a stock-lick in Victoria.

Potash Fertilizers.

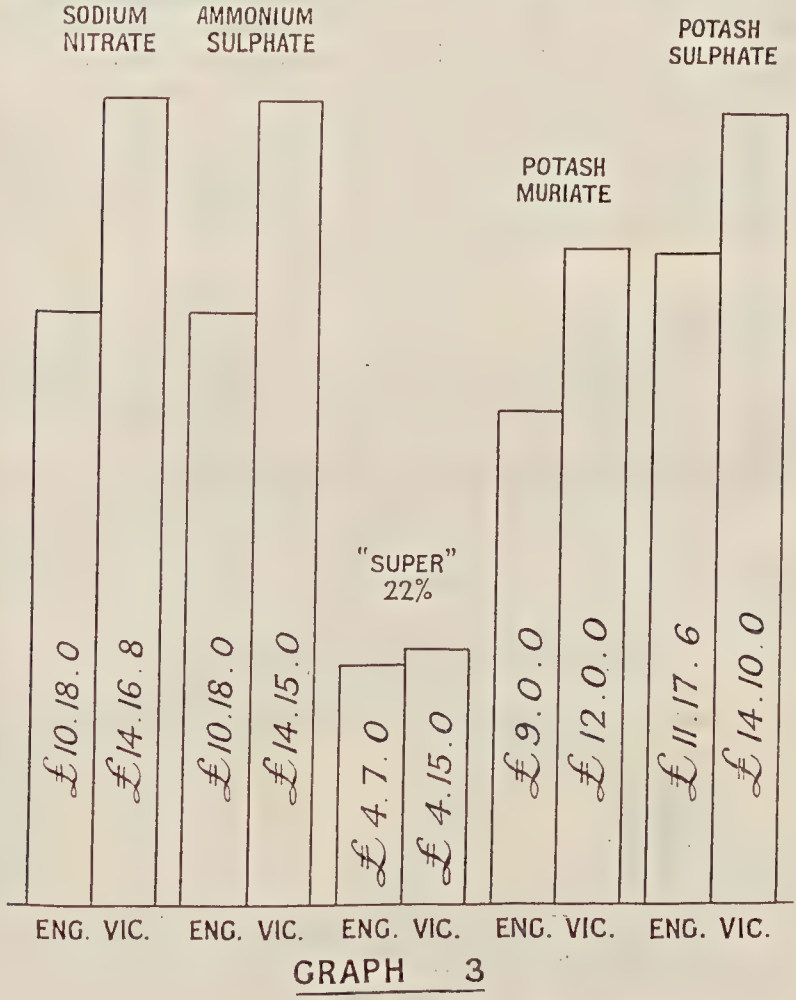
Prior to 1908 the price of potash, as potash sulphate and potash muriate (chloride) in Victoria, was the same; since that year the price of potash, as sulphate, has always been dearer than that of potash in the chloride form.

For three years, during and after the war—viz., 1917, 1918, and 1919—imported potash fertilizers were unprocurable. Immediately

prior to this period the price had soared to £25 per ton, and in 1921 it reached £35. However, since the latter year the price has steadily declined until to-day, when the producer pays the pre-war figure for his potash fertilizers which are, approximately, 30 per cent. dearer in Victoria than in England (see Graph 3, below).

Sodium Nitrate.

This fertilizer is imported from Chili, and in Victoria is used not so much as an artificial fertilizer as it is in the production of acid for fertilizer manufacture.



GRAPH 3

Comparison of prices of Fertilizers in England and Victoria.

During the year 1905 Twenty shillings would purchase 29 lb. of nitrogen in the form of sodium nitrate. The price increased during and immediately after the war until in 1921 Twenty shillings purchased only 11.5 lb. of nitrate nitrogen. Since 1921, however, there has been a gradual decline in the price until the present year, and now for an

expenditure of Twenty shillings in sodium nitrate 23 lb. of nitrogen are received, which is, approximately, the quantity received in the pre-war year of 1913.

The fertilizer is much cheaper in England, where the farmer receives 32.5 lb. of nitrate nitrogen for every Twenty shillings spent in purchasing nitrate of soda.

Dried Blood, Blood and Bone, and Animal Fertilizers.

The prices of these fertilizers show an appreciable reduction in recent years although they are, like bonedust, still much dearer than in pre-war times. It seems unsound that nitrogen in the form of blood should annually top the poll in the list of unit values, and the reason is mainly the cost of manufacture. Of course, in the case of organic fertilizers of this description, the humus content has some value.

Dried blood is but little used as a fertilizer in Victoria, and probably the demand for it as a protein food for poultry is a factor in holding it at a high price. Appreciable quantities of blood and bone, and the like, are utilized by intense culturists, the slow consistent action of these fertilizers being greatly favoured by the fruit-growers.

Other Fertilizers.

There is little to call for comment as regards fertilizers other than those already reviewed.

It should be remembered, however, that "mixed" and "special" fertilizers are comparatively dear when their worth is computed on the basis of unit values. This may be traced to the increased cost due to mixing.

Certain imported concentrated fertilizers which have been registered in recent years in Victoria are highly concentrated and readily available. They are worthy of trial by market gardeners and the like.

A comparison between the prices charged per ton for the main simple artificial fertilizers in England and Victoria is shown on Graph 3, page 23.

List of Unit Values for the Year 1930.

Fertilizers Acts 1915 (No. 2652), and 1928 (No. 3597).

	£	*s.*	*d.*
Nitrogen, organic, as Blood, Blood and Bone, Blood, Bone, and Flesh, and Fine Bone	1	2	5
,, ,, as Coarse Bone	1	1	0
,, as Nitrate	0	19	4
,, as Urea	0	16	4
,, as Ammonia	0	14	6
Phosphoric Acid—			
as Water Soluble	0	4	5
as Citrate Soluble—			
in Blood and Bone, in Animal Fertilizers, as Fine Bone, and in Mixed Fertilizers, containing any or all of the foregoing	0	5	6
in all other Fertilizers	0	4	3
as Citrate Insoluble—			
in Blood and Bone, in Animal Fertilizers, as Coarse Bone, and in Mixed Fertilizers, containing any or all of the foregoing	0	4	6
in other Mixed Fertilizers, and in Ground Phosphate	0	2	9
in other Fertilizers	0	1	0
Potash, as Sulphate	0	6	0
,, as Muriate	0	4	10

Melbourne, 25th November, 1929.

W. R. JEWELL,
Chemist for Agriculture.

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACTS 1915 (No. 2652), AND 1928 (No. 3597) FOR THE YEAR 1930.

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Flesh, and Bone.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Nitrogeneous, Readily Soluble.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Nitrate of Soda ..	Sickle in diamond ..	15·50	..	..	..	..	15·50	..	..	..	..	..	14 10 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
„ „ ..	Pivot	15·50	..	..	..	..	15·50	..	..	..	..	..	15 0 0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-street, Melbourne
„ „ ..	Cresco	15·00	..	..	..	..	15·00	..	..	..	..	..	15 0 0	Cresco Fertilizers Ltd., North Geelong
Nitrate of Lime and Ammonia	BA over SF in circle..	15·00	0.50	..	..	..	15·50	..	..	..	..	..	14 10 0	Dyes and Chemicals Aust. Ltd., 573 Lonsdale-street, Melbourne
Nitrate of Ammonia with Chalk	Calnitro I.G. BA over SF in circle	10·25	10·25	..	..	..	20·50	..	..	..	..	..	15 10 0	„ „ „ „
Sulphate of Ammonia ..	Sickle in diamond ..	..	20·60	..	..	..	20·60	..	..	..	..	..	14 15 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
„ „ ..	Pivot	..	20·00	..	..	..	20·00	..	..	..	..	..	14 15 0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-street, Melbourne
„ „ ..	Cresco	..	20·00	..	..	..	20·00	..	..	..	..	..	14 15 0	Cresco Fertilizers Ltd., North Geelong
„ „ ..	M.G. Co. in diamond	..	20·59	..	..	..	20·59	..	..	..	..	..	14 15 0	The Metropolitan Gas Co., Flinders-street, Melbourne
Urea	BA over SF in circle	..	..	..	..	..	46·00 (as Urea)	..	..	..	..	..	37 10 0	Dyes and Chemicals (Aust.) Ltd., 573 Lonsdale-street, Melbourne
Moderately Soluble.														
Dried Blood	Imperial	..	..	11·75	..	..	11·75	..	..	..	0·75	0·50	12 0 0	W. Angliss and Co. (Aust.) Pty. Ltd., 42 Bourke-street, Melbourne
„ „	Pannifex's	..	..	11·00	..	..	11·00	..	..	..	0·50	1·10	16 0 0	H. C. Pannifex and Co., 26 Market-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACTS 1915 (No. 2652) AND 1928 (No. 3597) FOR THE YEAR 1930—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Flesh, and Bone.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Nitrogeneous—Moderately Soluble—continued.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Blood Manure	Nifex	..	..	7·50	..	..	7·50	..	..	..	1·00	0·25	8 15 0	H. C. Pannifex and Co., 26 Market-street, Melbourne
„ „	Cockbill's	..	..	8·50	..	..	8·50	..	..	..	1·00	..	8 10 0	J. Cockbill, 407 Post Office-place, Melbourne
„ „	M.C.C. in diamond ..	..	..	8·02	..	..	8·02	..	..	..	1·25	0·61	9 1 3	Melbourne City Council, Town Hall, Melbourne
Slowly Soluble.														
Castor Meal	Alba	..	..	..	..	..	5·00 (organic)	..	..	2·25	2·25	0·75	5 15 0	Lycett Pty. Ltd., Normanby-road, Montague, Melbourne
Phosphatic. Readily Soluble.														
Superphosphate ..	Pivot, 22% ..	..	..	..	..	..	..	20·50	0·50	1·00	22·00	..	4 15 0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-street Melbourne
„ ..	Sickle in diamond, 22%	..	..	..	..	..	..	20·50	0·50	1·00	22·00	..	4 15 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
„ ..	Cresco, 22 ..	..	..	..	..	..	..	20·50	0·50	1·00	22·00	..	4 15 0	Cresco Fertilizers Ltd., North Geelong
„ ..	Cockbill's, 22% ..	..	..	..	..	..	..	20·50	0·50	1·00	22·00	..	4 15 0	J. Cockbill, 407 Post Office-place, Melbourne
„ ..	Pivot, 24% ..	..	..	..	..	..	..	22·00	0·50	1·50	24·00	..	5 0 0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-street, Melbourne
„ ..	Sickle in diamond, 24%	..	..	..	..	..	..	22·00	0·50	1·50	24·00	..	5 0 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACTS 1915 (No. 2652) AND 1928 (No. 3597) FOR THE YEAR 1930—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Flesh, and Bone.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Phosphatic—Readily Soluble—continued.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Superphosphate ..	Cresco, 24 ..	..	..	..	..	..	..	22·00	0·50	1·50	24·00	..	5 0 0	Cresco Fertilizers Ltd., North Geelong
Moderately Soluble.														
Super and Phosphate ..	Cresco, 50/50 ..	..	..	..	..	..	..	9·16	1·84	17·40	28·40	..	5 0 0	Cresco Fertilizers Ltd., North Geelong
„ „ ..	Sickle in diamond ..	..	..	..	..	..	..	10·00	0·50	18·50	29·00	..	5 0 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
„ „ ..	Cresco Phosphatic Guano and Super ..	..	..	..	..	..	..	7·30	5·50	10·05	22·85	..	5 0 0	Cresco Fertilizers Ltd., North Geelong
Basic Phosphate ..	Pivot	..	..	..	..	..	..	..	15·50	3·20	18·70	..	5 10 0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-street, Melbourne
„ „ ..	Sickle in diamond ..	..	..	..	..	..	..	..	15·50	3·20	18·70	..	5 10 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street Melbourne
Slowly Available.														
Ground Phosphate ..	Sickle in diamond, 80%	..	..	..	..	..	..	..	..	36·65	36·65	..	5 0 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
„ „ ..	Pivot	..	..	..	..	..	..	..	..	36·65	36·65	..	5 0 0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-street, Melbourne
„ „ ..	Cresco, 76% ..	..	..	..	..	..	..	..	..	34·80	34·80	..	4 15 0	Cresco Fertilizers Ltd., North Geelong

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACTS 1915 (No. 2652) AND 1928 (No. 3597) FOR THE YEAR 1930—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Flesh, and Bone.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Potassic—Readily Soluble.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Muriate of Potash ..	Cresco	..	..	..	..	..	..	..	..	..	..	50·00	12 0 0	Cresco Fertilizers Ltd., North Geelong
" " ..	Sickle in diamond ..	..	..	..	..	..	..	..	..	..	..	50·00	12 0 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
Sulphate of Potash ..	Sickle in diamond ..	..	..	..	..	..	..	..	..	..	..	48·50	14 10 0	" " " "
" " ..	Pivot	..	..	..	..	..	..	..	..	..	..	48·50	14 10 0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-street, Melbourne
" " ..	Cresco	..	..	..	..	..	..	..	..	..	..	48·50	14 10 0	Cresco Fertilizers Ltd., North Geelong
Containing Nitrogen and Phosphoric Acid.														
Readily Soluble.														
Super and Ammonia ..	Sickle in diamond, No. 1	..	2·85	..	..	..	2·85	17·57	0·39	0·80	18·76	..	7 5 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
" " ..	Sickle in diamond, No. 2	..	5·00	..	..	..	5·00	15·37	0·37	0·76	16·50	..	8 10 0	" " " "
Nitro-Superphosphate ..	Sickle in diamond ..	..	1·50	..	..	0·50	2·00	16·69	1·12	2·01	19·82	..	7 0 0	" " " "
Di-ammoniumphosphat I.G.	BA over SF in circle..	..	20·60	..	..	..	20·60	53·00	..	..	53·00	..	33 0 0	Dyes and Chemicals (Aust.) Ltd., 573 Lonsdale-street, Melbourne
Moderately Soluble.														
Ammonia and Phosphate	Cresco	..	2·00	..	..	..	2·00	8·30	1·60	15·70	25·60	..	6 5 0	Cresco Fertilizers Ltd., North Geelong

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACTS 1915 (No. 2652) AND 1928 (No. 3597) FOR THE YEAR 1930—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Flesh, and Bone.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Containing Nitrogen and Phosphoric Acid—Moderately Soluble—continued.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Blood, Bone, and Super..	Sickle in diamond ..	..	..	..	..	2·50	2·50	12·51	1·43	2·96	16·90	..	7 10 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
„ „ „ ..	Cockbill's	..	..	..	2·50	...	2·50	12·51	1·43	2·96	16·90	..	7 10 0	J. Cockbill, 407 Post Office-place, Melbourne
Bone and Super ..	Sickle in diamond, No. 1	..	..	..	..	2·00	2·00	11·38	3·08	5·32	19·78	..	7 15 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
„ „ ..	Cresco	..	..	..	2·00	..	2·00	9·50	3·90	3·00	16·40	..	7 17 6	Cresco Fertilizers Ltd., North Geelong
Bone Fertilizer and Super	Elsworth's	..	..	..	..	1·50	1·50	11·00	2·50	5·00	18·50	..	7 0 0	W. R. Elsworth, 128 Victoria-street, Ballarat
Super and Bone ..	Cresco	..	..	..	..	1·00	1·00	16·10	1·10	3·60	20·80	..	6 15 0	Cresco Fertilizers Ltd., North Geelong
„ „ ..	Sickle in diamond, No. 2	..	..	..	..	1·00	1·00	15·95	1·79	3·16	20·90	..	6 15 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
Blood and Bone ..	Imperial	..	..	..	4·75	..	4·75	..	5·00	11·00	16·00	..	8 10 0	W. Angliss and Co. (Aust.) Pty. Ltd., 42 Bourke-street, Melbourne
„ „ ..	Sickle in diamond ..	..	..	..	..	5·00	5·00	..	6·00	10·00	16·00	..	10 10 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
„ „ ..	T.B. and S. in diamond, Brooklyn	..	..	..	5·75	..	5·75	..	3·95	8·55	12·50	..	10 0 0	Thomas Borthwick and Sons (Australasia) Ltd., 84 William-street, Melbourne
„ „ ..	T.B. and S. in diamond, Lighthouse	..	..	..	5·47	..	5·47	..	4·46	7·19	11·65	..	10 0 0*	„ „ „ „

* At Portland.

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACTS 1915 (No. 2652) AND 1928 (No. 3597) FOR THE YEAR 1930—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Flesh, and Bone.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Containing Nitrogen, and Phosphoric Acid—Moderately Soluble—continued.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Blood and Bone ..	J. A. Dundas ..	..	..	..	..	4·50	4·50	..	7·14	13·61	20·75	..	9 10 0	J. A. Dundas, Dynon-road, Footscray
,, ,, ..	W. and M. in circle ..	..	..	..	6·00	..	6·00	..	4·50	5·50	10·00	..	11 10 0	Western and Murray Co.-op. Bacon and Meat Packing Co. Ltd., 522 Flinders-lane, Melbourne
,, ,, ..	Fitzgerald's ..	..	..	..	5·10	..	5·10	..	9·15	6·01	15·16	..	9 10 0	Patrick Fitzgerald and Sons, Warragul-road, Bentleigh
,, ,, ..	Pannifex's No. 2 ..	..	..	..	..	7·17	7·17	..	5·00	6·99	11·99	..	11 10 0	H. C. Pannifex and Co., 26 Market-street, Melbourne
,, ,, ..	Pannifex's No. 3 ..	..	..	..	..	6·90	6·90	..	4·00	5·50	9·50	..	11 0 0	,, ,, ,, ,,
,, ,, ..	Pannifex's No. 1 ..	..	..	..	..	6·35	6·35	..	5·00	6·50	11·50	..	10 5 0	,, ,, ,, ,,
,, ,, ..	Cockbill's	..	..	..	..	5·25	5·25	..	3·00	9·00	12·00	..	10 0 0	J. Cockbill, 407 Post Office-place, Melbourne
,, ,, ..	Arch	..	..	..	7·12	..	7·12	..	8·32	2·68	11·00	..	10 10 0	Amalgamated Freezing Co. (Vic.) Pty. Ltd., 499 Little Collins-street, Melbourne
,, ,, ..	Cresco	..	..	..	5·00	..	5·00	..	3·00	11·50	14·50	..	10 10 0	Cresco Fertilizers Ltd., North Geelong
,, ,, ..	King's, Geelong ..	..	..	..	5·00	..	5·00	..	6·90	8·60	15·50	..	9 0 0	J. C. King and Sons Pty. Ltd., Little Fyans-street, South Geelong
,, ,, ..	Pridham's	..	..	..	5·32	..	5·32	..	9·30	6·70	16·00	..	9 0 0	W. Pridham Pty. Ltd., Evans-street, Braybrook
Bonedust and Blood ..	Rohs in circle, Bendigo	..	..	..	6·00	..	6·00	..	4·00	9·00	13·00	..	11 0 0	P. Rohs Pty. Ltd., Bridge-street, Bendigo
Animal Fertilizer ..	Fertbone	..	..	..	..	5·00	5·00	..	4·00	8·00	12·00	..	8 10 0	H. C. Pannifex, 26 Market-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACTS 1915 (No. 2652), AND 1928 (No. 3597) FOR THE YEAR 1930—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash (Sulphate.)	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Flesh, and Bone.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Containing Nitrogen and Phosphoric Acid—Moderately Soluble—continued.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Animal Fertilizer ..	Pannifex's No. 2 ..	..	..	..	..	4·50	4·50	..	5·00	12·00	17·00	..	9 15 0	H. C. Pannifex, 26 Market-street, Melbourne
,, ,, ..	Pannifex's No. 3 ..	..	..	..	..	5·50	5·50	..	5·00	10·00	15·00	..	10 0 0	,, ,, ,, ,,
,, ,, ..	Pannifex's No. 4 ..	..	..	..	..	6·00	6·00	..	5·00	7·00	12·00	..	10 5 0	,, ,, ,, ,,
Bone Fertilizer ..	Eclipse	..	..	..	..	2·98	2·98	..	9·96	6·86	16·82	..	8 0 0	Thomas A. Mills, Golden Square, Bendigo
,, ,, ...	Elsworth's	..	..	..	..	3·00	3·00	1.50	4·00	9·50	15·00	..	8 0 0	W. R. Elsworth, 128 Victoria-street, Ballarat
Containing Nitrogen, Phosphoric Acid, and Potash.														
Market Garden Manure ..	Sickle in diamond ..	..	1·50	..	..	1·56	3·06	10·82	2·44	4·25	17·51	2·42	8 10 0	Commonwealth Fertilizers and Chemicals Ltd., 65 William-street, Melbourne
Complete Manure ..	Sickle in diamond, No. 1	..	2·50	..	..	..	2·50	14·87	0·36	0·72	15·95	7·26	8 12 6	,, ,, ,, ,,
,, ,, ..	Sickle in diamond, No. 2	..	1·00	1·00	..	..	2·00	14·85	0·36	0·72	15·93	4·85	7 17 6	,, ,, ,, ,,
,, ,, ..	Sickle in diamond, No. 3	..	8·00	..	..	..	8·00	10·19	0·25	0·50	10·94	5·00	11 0 0	,, ,, ,, ,,
,, ,, ..	Sickle in diamond, No. 4	..	1·00	..	..	1·40	2·40	10·94	2·22	3·86	17·02	5·00	8 10 0	,, ,, ,, ,,
,, ,, ..	Sickle in diamond, No. 5	..	3·33	..	..	..	3·33	13·68	0·33	0·67	14·68	8·07	9 5 0	,, ,, ,, ,,
Mixed Manure ..	Cresco	..	1·50	..	..	..	1·50	7·10	1·40	13·50	22·00	7·50	7 12 6	Cresco Fertilizers Ltd., North Geelong
,, ,, ..	Cresco, No. 2 ..	..	1·00	..	1·40	..	2·40	11·25	2·00	4·50	17·75	5·00	8 10 0	,, ,, ,, ,,

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACTS 1915 (No. 2652) AND 1928 (No. 3597) FOR THE YEAR 1930—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash (Sulphate).	Price asked per ton.	Where obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Flesh, and Bone.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Containing Nitrogen, Phosphoric Acid, and Potash—continued.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Nitro-phoska I.G. ..	BA over SF in circle	4·50	11·50	..	..	..	16·00	16·50	..	..	16·50	21·50 *	23 0 0	Dyes and Chemicals (Aust.) Ltd., 573 Lonsdale-street, Melbourne
,, ,, ..	BA over SF in circle, No. 4	5·00	10·50	..	..	..	15·50	15·00	1·00	..	16·00	19·00	23 0 0	,, ,, ,, ,,

* As chloride.

Description of Fertilizer.	Brand.	Nitrogen.	Phosphoric Acid.	Mechanical Condition.		Price asked per ton.	Where Obtainable.
				Fine Bone.	Coarse Bone.		
		%	%	%	%	£ s. d.	
Bonedust	Ox	3·95	21·26	50·00	50·00	7 10 0	Successors to Thos. Brown, Gray-street, Hamilton
,, ...	Pannifex's No. 2 ..	4·00	19·00	50·00	50·00	9 17 6	H. C. Pannifex and Co., 26 Market-street, Melbourne
,, ...	Eclipse	3·27	24·59	69·40	30·60	9 10 0	Thomas A. Mills, Golden Square, Bendigo
,, ...	Rohs in circle ..	4·00	19·00	50·00	50·00	9 10 0	P. Rohs Pty. Ltd., Bridge-street, Bendigo
,, ...	Bailey Bros. ..	3·00	19·00	50·00	50·00	8 0 0	Bailey Bros., 8 Sturt-street, Ballarat
,, ...	King's, Geelong ..	2·26	23·42	78·00	22·00	10 0 0	J. C. King and Sons Pty. Ltd., Little Fyans-street, South Geelong

Melbourne, 25th November, 1929.

W. R. JEWELL, Chemist for Agriculture.

BROWN ROT AND TRANSIT ROT AND THEIR CONTROL.

A Report on Consignments of Peaches sent from the Goulburn Valley to the Sydney Market.

By S. Fish, M.Agr.Sc., Plant Research Laboratory, Department of Agriculture.

Economic Importance of the Problem.

The Sydney market received from some 400 Goulburn Valley growers during the seasons 1924-25, 1925-26, 1926-27, approximately 250,000 cases of fruit per year, worth £100,000—the average price per case being estimated at 8s. Over the same period, the loss due to Brown and Transit Rots was 2s. 6d. per case, showing a total loss per year of about £30,000. In 1927-28, approximately 300,000 cases reached Sydney from the above-mentioned growers, and the loss for that year was estimated, from reliable data, around £37,000. Examinations made at Sydney in 1928 of thirty-nine consignments from Goulburn Valley growers showed five consignments to be sound, while the remaining thirty-four consignments showed damage varying from 20 per cent. to 100 per cent. The injury was due to Transit Rot and to Brown Rot, and in some cases to both.

Besides this severe monetary loss, the distribution of the fruit was greatly limited because buyers had become sceptical of the keeping quality of this fruit. Investigation showed that about 60 per cent. of the fruit sent to Sydney was sold to the third class buyers, these being the second class shopkeepers and proprietors of open stalls in the city and suburbs who buy medium grade and slightly wasty fruit. The remainder was sold to the casual barrowman at about ninepence per case. Had this price not been accepted by the agents, such fruit would have been tipped, and for this service a debit charge of 4d. per case would have been imposed on the grower.

It was seen that a large potential market would exist in Sydney for Goulburn Valley fruit if these rots could be controlled. This demand would come from the first class buyers—the country forwarding agents who require sound fruit that will carry from two to five days for the country forwarding trade. This class of buyer has largely ceased ordering owing to the difficulty of securing fruit free from the rots. Again, a demand would come from the second class buyers—the first class shopkeepers in the city and suburbs who buy fruit of a sound but somewhat riper condition than that required for the country forwarding trade. These buyers who, it must be remembered, draw their customers from a population of over a million, will not purchase re-conditioned fruit.

Brown and Transit Rots are among the factors contributing to fruit gluts in the Sydney market. Sound peaches may be held up to three weeks in cool store, but fruit showing the rots cannot be profitably stored. The delivery of peaches from the Goulburn Valley to Sydney during the peach season normally reaches 5,000 cases on a Monday morning. In addition to this, where fruit is transferred at

Plate 1.—Peaches Affected with Transit Rot Fungus.

Albury on Sunday, a further 5,000 cases arrive on Monday afternoon. Of these 10,000 cases, those which arrive in a sound condition sell first. The wasty fruit is carried over till Wednesday, by which time another 5,000 cases have arrived. The same conditions applying as before, it follows that a gradual accumulation of inferior fruit occurs which is eventually sold to the casual barrowman, or is finally tipped as unfit for sale. The effect of the agent's advice to growers on Wednesday results in small quantities reaching Sydney after the following Monday. The market shows an improved value on Tuesday. Agents again wire growers with the result that large consignments again come forward. Where the rots occur in these consignments, the position as described is repeated. Where the consignments arrive in a sound condition, agents have the alternative of cool storing any surplus as against forced sales because of a rapidly wasting article.

Cause of the Rots.

Two fungi with differing characteristics are responsible for this damage. However, when considering the position over a number of years, the Transit Rot fungus (*Rhizopus nigricans*) is by far the more important. This fungus produces a soft rot, and the affected fruit "leaks." A mass of vegetative strands known to the growers as "whiskers" develops on the fruit. Some of these strands have small, round, black bodies at their tip; such bodies contain the spores of the fungus. (See Plate 1.)

Brown Rot fungus (*Sclerotinia americana*) is common in certain years, particularly in consignments of fruit from those orchards where brown rot has established itself in the trees. This is a firm rot. The affected tissue turns brown, and tufts of ash grey spores develop on the surface of this brown area. Fruit affected with the rot does not leak. (See Plate 2.)

Sources of Infection.

By exposure of Petri dishes containing sterile media, the sources of infection of transit rot fungus were examined. Such dishes, after exposure, were placed in an incubator at 25° C. in order to develop the fungus. A culture of the fungus was obtained from:—

(1) surface of a sound peach while still on the tree;
(2) dust in the picking bags;
(3) dust in the picking boxes;
(4) atmosphere of the packing shed;
(5) new cases where stacked in contaminated sheds;
(6) dust on the grader;
(7) dust from lorries;
(8) diseased fruits;
(9) dust from railway trucks;
(10) atmosphere of the market.

An experiment was conducted to determine the influence of the elimination of picking bags, boxes and graders as sources of infection on Transit Rot development. Picking bags and boxes were boiled

for three minutes, and the grader thoroughly washed down with 10 per cent. bluestone solution. Eighteen new cases were handled in the ordinary way; subsequently, the picking bags, picking boxes and the

Plate 2.—Peaches Affected with Brown Rot Fungus.

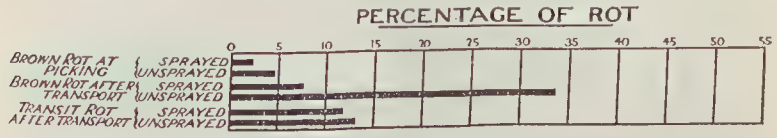
grader were treated as described, and fifteen more cases were packed. In both lots, the greatest care in handling was taken. In Sydney, it was found that 7 out of 18 ordinarily treated cases—38 per cent.—and

3 out of 15 cases—20 per cent.—of the specially treated cases, were affected by transit rot. The treatment mentioned had apparently lessened the amount of transit rot, but had not eliminated it.

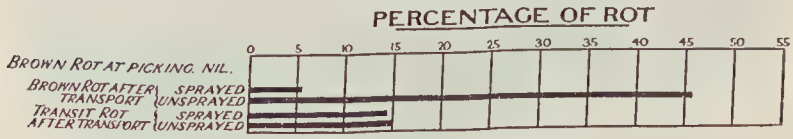
The sources of the brown rot spores in the Goulburn Valley are diseased fruit, leaves and twigs (see Plate 5), such spores being blown by the wind. Cultures of this fungus have been obtained from the atmosphere of orchards in which the disease was present. Cultures of brown rot fungus were obtained from the surface of a sound but unripe peach while on the tree. Spores are spread also by pickers and by the grader, owing to occasional diseased fruit being picked and not being discovered until seen on the grader.

Orchard Spraying in relation to the Development of Brown and Transit Rots during Transport.

Work along these lines has been carried out by Drs. C. Brooks and D. F. Fisher[1] which showed that fruit which came from sprayed trees developed less brown rot in transport than did fruit from unsprayed trees, while transit rot was not affected by spraying.


PERCENTAGE OF ROT
0 5 10 15 20 25 30 35 40 45 50 55
BROWN ROT AT PICKING
BROWN ROT AFTER TRANSPORT
TRANSIT ROT AFTER TRANSPORT
SPRAYED
UNSPRAYED

Graph No. 1.


PERCENTAGE OF ROT
0 5 10 15 20 25 30 35 40 45 50 55
BROWN ROT AT PICKING. NIL.
BROWN ROT AFTER TRANSPORT
TRANSIT ROT AFTER TRANSPORT
SPRAYED
UNSPRAYED

Graph No. 2.

Graph No. 1 is taken from the paper presented by Brooks and Fisher.

Graph No. 2 shows the result that was obtained when 200 Pullars Cling peaches from unsprayed trees and 200 of the same variety from lime sulphur sprayed trees were sent to Melbourne. This, although a single experiment, showed a similar result to that obtained by Brooks and Fisher.

Factors Favouring Infection.

(*a*) Fruit Injury.

Work by Brooks and Cooley[2] shows that the transit rot fungus seldom, if ever, penetrates a sound peach, and it is the opinion of these writers that the unbroken skin of a peach furnishes a complete protection against this fungus except where a sound peach is in close contact with one that is already decayed.

In an experiment carried out with peaches from the Goulburn Valley, circles were drawn on the surface of the fruit, and in some instances, a needle pierce was made in the centre of these circles about 1 mm. deep. Spores and vegetative portions of fungus were placed in the injuries made, while in other instances, the spores and vegetative portions of the fungus were placed in the centre of the circles on the

apparently uninjured surfaces. The peaches were then placed under humid conditions and held at 73° F. In 98 hours, those which had been pierced were completely covered with Transit Rot fungus, whereas the uninjured peaches were quite sound.

With Brown Rot it is generally recognized that no injury of the skin is necessary for the infection. In an experiment carried out on this point, circles were drawn on the surface of peaches and spores of brown rot fungus were introduced into needle pierces 1 mm. deep in the centre of the circles. Spores were then placed on the apparently uninjured surfaces in the centre of the other circles. The peaches were then held under humid conditions at 73° F. Within 24 hours,

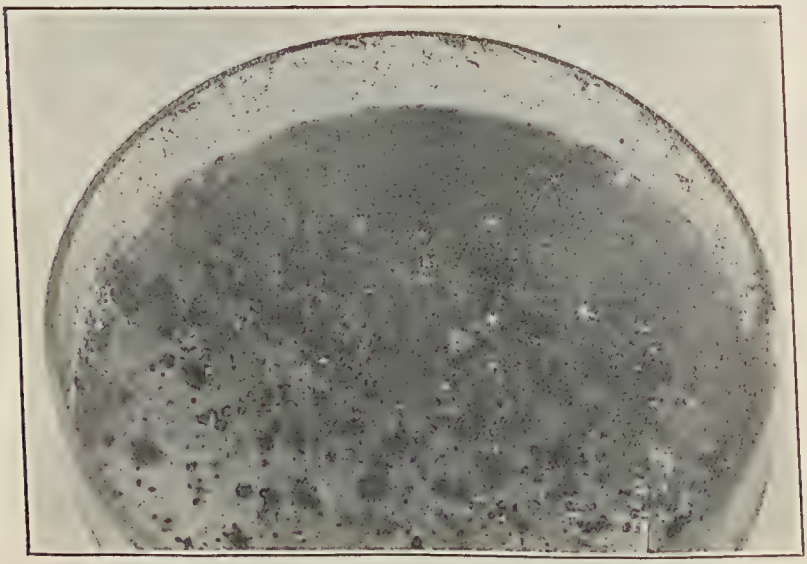


Plate 3.

A Petri dish containing sterile media was exposed in an inverted picking box for five seconds after the box had been given a slight knock to dislodge the dust. The dish was then placed in an incubator, and the Transit Rot fungus developed. Note the small black fruiting bodies.

the pierced inoculations showed infection, and it took 70 hours for the peaches on whose uninjured surfaces spores had been placed, to show development to the same extent.

From this it appears that transit rot fungus requires an injury in the skin of the peach for infection, whereas brown rot fungus does not require an injury, but infection is certainly favoured if an injury is present.

During examination at the Sydney market of growers' consignments, it was repeatedly observed that many transit rot "nests" occurred at the corner of the case. The cases have a rough hardwood partition, and are papered one way, thus exposing four faces of rough board. Where fruit is not packed tightly, shaking, incidental to the 500 miles of travel, has the effect of injuring the fruit in contact with these rough surfaces, thus supplying one of the favorable factors for infection.

(*b*) WEATHER CONDITIONS.

The severity and the incidence of brown rot depend largely on weather conditions. In a dry season, it may be expected that a crop will remain free from this disease, but a series of cloudy days followed by frequent showers, especially at picking time, appears to greatly favour the development of the fungus. Transit Rot in peaches is generally very severe in seasons where heavy rains fall immediately after the final irrigation before picking has been given.

(*c*) TEMPERATURE.

Up till now, the ordinary iron Louvre truck has been used in shipping fruit from the Goulburn Valley to Sydney. In the course

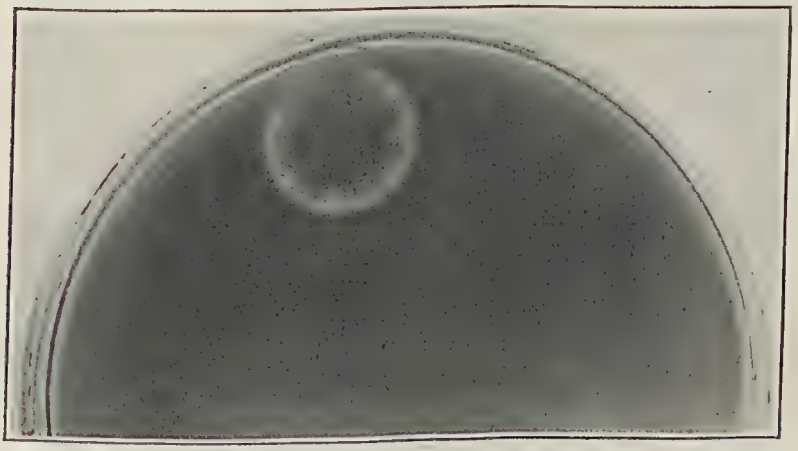


Plate 4.

The picking box referred to in the explanation of Plate 3 was placed for one minute in water of a temperature of 100° C. It was then inverted and allowed to dry, after which it was given a knock to dislodge the dust. A Petri dish containing sterile media was then exposed in this dust for five seconds, and was placed in an incubator where Transit Rot fungus failed to develop, although the conditions were known to be favorable to its development.

of an experiment, temperatures were taken at different points in a load of peaches which was sent in an iron truck to Sydney.

Before loading (Average of 5 readings	84° F.)	..	75°—90° F.
During transit (Average maximum	90° F.)	..	84°—94° F.
minimum	64° F.	..	58°—69° F.
mean	77° F.		

It is usually four days or longer from the time the fruit is picked until it is sold in Sydney.

Work by Brooks and Cooley[3] showed that a temperature of 50° F. has held Brown Rot in check for two days, and Transit Rot in check for three days. A temperature of 45.5° F. has held Brown Rot in check for three days, and transit rot in check for six days or more. A temperature of 41° F. has held Brown Rot entirely in check for four days, and 36.5° F. has held it in check for 6 days. It was thus

seen that, by low temperatures, Transit Rot development could be inhibited to a relatively greater extent than could Brown Rot development.

In an experiment carried out with Stalley peaches from the Goulburn Valley, it was shown that fruits inoculated with brown rot spores and held in saturated atmospheres at temperatures of 32° F., 34° F., 36° F., 38° F., 40° F., and 71° F., took 17 days to develop to a spot 1 cm. in diameter at 32° F., 11½ days to develop to the same extent at 34° F., 11 days at 36° F., 7 days at 38° F., 6 days at 40° F., and 1 day at 71° F.

In a similar experiment carried out with fruits inoculated with the Transit Rot fungus, placed in a saturated atmosphere, and held at 32° F., 34° F., 36° F., 38° F., 40° F., and 74° F., no development took place, even after 17 days, in those peaches held at temperatures from 32°–40° F., whereas at 74° F., all peaches were severely affected in 93 hours.

This experiment gave a similar conclusion to that deduced from the work of Brooks and Fisher, namely, that low temperatures depress the development of Transit Rot to a relatively greater extent than do such temperatures in the case of Brown Rot.

Pre-cooled and Ice Truck Consignments sent to Sydney from the Goulburn Valley.

In December, 1927, the Shepparton growers were induced to pre-cool 492 cases of Hales peaches intended for the Sydney market. These peaches were held in the cool chambers of the Shepparton Cannery for four days at a temperature of 35° F. They were then put into trucks that had been pre-iced for half an hour before receiving the fruit. This consignment was sent to Albury where the fruit was loaded into a New South Wales refrigerator car which had been pre-iced for thirteen hours. The fruit was sent to Sydney, and a thermographic record was obtained by Mr. O. Barr, of the New South Wales Railways. The temperature conditions were as follow:—61°–63° F. at the Shepparton loading; these temperatures fell to 53°–56° F., and did not rise beyond that point until Albury was reached. In the New South Wales car, the temperature at Albury was 56° F., and the roof temperature gradually rose to 63° F., and the floor temperature dropped to 50° F. during the journey to Sydney. The mean daily temperatures during these two days was 68° F., rising to a maximum of 80° F. Examination in Sydney showed no Transit Rot, but 180 cases showed Brown Rot to some extent. According to Mr. D. G. Wills, the Sydney representative of the Goulburn Valley growers, the prices realized justified the expense.

The Ardmona Fruitgrowers Association sent 12,112 cases of pre-cooled and ice-trucked fruit from the Goulburn Valley to Sydney during the season 1927-28. According to Sydney reports, this fruit arrived in a sound condition, and agents complimented the growers on its condition. However, in spite of this, no increased prices were obtained for this fruit over the Louvre-trucked consignments. In fact, on an average, the price was lower. Investigation into this showed that buyers, on noticing that the fruit was cool, thought that it was "carry over fruit" which had been stored in Sydney. Such fruit

Plate 5.—Showing fruit, leaf and twig infection of Peach by Brown Rot fungus.

generally rots rapidly when taken out of the cool store because it is generally infected by fungi at high temperatures before being stored.

This was the main reason for the decreased prices, and serves to illustrate the lack of confidence which existed among buyers of Goulburn Valley fruit.

The Ardmona Fruitgrowers were further induced in 1928-29 to send 22,172 cases of pre-cooled fruit to Albury in iced trucks, and thence to Sydney in Louvre trucks. They were forwarded to Sydney mainly in these trucks because the New South Wales Railway Department increased the freight 50 per cent. for the use of the ice trucks.

Although these consignments were all sound, a number of them did not bring increased prices. It was seen that besides, in many cases, mistaking this fruit for "carry over," a number of consignments of the cooled fruit were mixed up on agents' stalls with uncooled fruit, and buyers were just as sceptical of this fruit as of the uncooled fruit, not realizing the different treatment it had received.

These were among some of the difficulties met with in an attempt to demonstrate the economic soundness of pre-cooling and ice-trucking as a means of controlling the transit rots. The buyers who have in the past been sceptical about operating on Goulburn Valley fruit are now commencing to look for and to buy this cooled fruit with confidence, and this will increase with the development of cooling. It is pleasing to note that many country forwarding agents are now operating with success on cooled fruit. Among the 1928-29 consignments from Ardmona, 125 cases of Zerbe peaches were sent across to Sydney from an Ardmona grower. Of these, 100 cases were pre-cooled and sent to Albury in iced trucks, and thence to Sydney in Louvre trucks. On the same train, the 25 remaining cases of peaches from the same orchard at a similar stage of ripeness were sent to Sydney in a Louvre truck as a check consignment. On arrival in Sydney, the uncooled fruit showed over-ripeness and rot development, while the cool fruit was perfectly sound.

A detailed comparison of the prices obtained for this fruit is as follows:—

No. of Cases.	Grade.	Price per Case.	No. of Cases.	Grade.	Price per Case.
Pre-cooled and Ice Trucked to Albury and thence to Sydney in Louvre Truck.			Uncooled Fruit in Louvre Truck.		
		s. d.			*s. d.*
1	Extra choice ..	14 0	1	Extra choice ..	7 0
8	Choice	14 0	2	Choice	7 0
..	..	..	1	Choice	6 0
..	..	..	1	Choice	5 0
24	A grade ..	13 0	3	A grade ..	7 0
..	..	..	2	A grade ..	6 6
..	..	..	1	A grade ..	5 0
15	B grade ..	12 0	4	B grade ..	7 0
16	B grade ..	11 0	2	B grade ..	6 6
..	..	..	1	B grade ..	6 0
19	C grade ..	10 0	5	C grade ..	7 0
17	C grade ..	9 0	2	C grade ..	5 0
100 cases			25 cases		

These data are most convincing, but it should not be concluded that every iced truck consignment would bring such an advance over Louvre consignments, because the incidence of rots and over-ripeness depends to a very large extent on weather conditions just before and during transport of the fruit. However, it can be seen that the practice will eliminate chance, and establish the confidence of the buyers. It is quite obvious that this stage, where less than one per cent. of the fruit sent to Sydney from the Goulburn Valley growers is pre-cooled and ice-trucked, is the vital one in the establishment of the practice in Victoria, and every facility should be given Goulburn Valley growers to get this well developed on a permanent commercial basis.

The Ardmona growers use the cool-store attached to the Ardmona Cannery for pre-cooling the fruit. The cannery authorities organize and despatch the cool consignments.

At Shepparton, the growers have arranged with the owners of the Shepparton Freezing Works to convert this into a cooler for pre-cooling fruit. This is now partially converted, and when completed, will have approximately 50,000 case capacity. Already, this season, a number of ice truck consignments have been despatched to Sydney from this place. The organization of the consignments is carried out by representatives of the owners of the cooler, and a commercial representative appointed by the growers.

Satisfactory commercial arrangements have been made by the growers with both the above organizations for the work performed.

. . . . .

In connexion with this investigation, I wish to acknowledge the co-operation and assistance of the Ardmona and Shepparton Fruit-growers Associations, the Ardmona and Shepparton Cannery authorities, Mr. D. G. Wills, the Sydney representative of the Goulburn Valley growers, and the New South Wales and Victorian Railways, all of whom have played an important part in bringing about this new development.

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MYCOTIC DERMATITIS.

R. N. Johnstone, B.V.Sc., Senior Veterinary Officer.

Mycotic Dermatitis is a mild inflammation of the skin affecting sheep, and resulting in the formation of a crust or scab which mats the wool in the immediate vicinity. These matted portions are frequently called "yolk sticks."

The disease appears to be very widespread in Victoria, for letters describing this condition and requesting advice as to the cause and the methods of prevention or of treatment have been received by the Veterinary Branch of the Department of Agriculture from almost every portion of the State where fine-wool sheep are kept.

By reason of the fact that until lately the disease had never been investigated by laboratory workers, little was known of its cause, and therefore no assistance of any value could be given. Quite recently, however, investigations have been carried out by L. B. Bull, D.V.Sc., of the Laboratory of Pathology and Bacteriology, Adelaide Hospital, and by H. R. Seddon, D.V.Sc., of the Veterinary Research Station, Glenfield, New South Wales, working quite independently, and as a result of their experiments, it is now known that the disease is caused by a fungus resembling that causing Actinomycosis in cattle.

Infectivity of Condition.

That the disease is infectious is indicated by the history of outbreaks in different flocks, e.g., in one flock of about 20,000 merinoes, it was noticed for the first time during the 1927-8 season when several sheep were found to be affected. At its onset, the disease appears to have been of an exceedingly virulent type; contrary to the usual experience, portions of the body not covered by wool became affected also.

The manager of the property suspected scab, and in order to prevent spread, and also with a desire to maintain the general appearance of the flock, the affected sheep were destroyed. At or just before shearing this year, a further number of sheep were found to be affected, and I visited the place. At the time of my visit an exact count had not been made, but the manager estimated that about 80 or 100 sheep had developed the disease.

In another flock, odd cases have been noticed for several years past, but at shearing this year, the discovery was made that 15 per cent. of the 3,000 weaners on the property had developed the disease. Young sheep appear much more susceptible than mature animals; resistance apparently increases with age.

The exact means of spread in the field have not yet been determined, but direct evidence of the infectivity of the disease is forthcoming as a result of experiments carried out by Dr. Seddon. These experiments were definitely designed to furnish information on this point.

Dr. Seddon writes as follows.—"On examination of the crusts or scabs, little difficulty is experienced in demonstrating the presence of mycelia therein, and for infective material, we have employed an emulsion of such scabs in water. Application was first made to the

shaven skin or to skin from which the wool had been removed with a depilatory. Later, the emulsion was simply spread over the surface of skin from which the wool had been closely clipped with scissors, the application being such that the skin was wetted with the emulsion. In all three cases infection resulted, and just as severe lesions were produced on unshaven as on shaven skin, though, as might have been expected, lesions appeared on the whole perhaps slightly earlier when all the wool had been removed. (They would also, however, be more readily detected on such skins.) The fact that infection occurred so readily in skin which had not been damaged by the slight scarification resulting from shaving, or by the irritating effects of a depilatory, is of importance, and indicates also that infection, if it penetrates the skin, is by medium of some natural passage into the skin. That the mycelia do, in fact, invade the wool follicles is shown by sections of the skin taken from an experimental case five days after spreading infectious material on the skin.

"An attempt at infection by contact was practised with one of the original natural cases, a healthy and a diseased animal being kept together for some weeks in a loose-box. No transmission resulted, but this is not surprising, owing to the fact that none of the scabby material was near the tip of the wool, and that in this affected sheep the scabs were actually lifting from the skin, i.e., the mycelium was probably not proliferating actively. There being no rubbing or scratching by the animal, infective material would not be spread about. Further, we have now reason to believe that the fact that the animals were kept dry played an important part.

"There is another point regarding infectivity which should be discussed, namely, the infectiousness of crusts or scabs.

"We may first consider scabs still adherent to the wool of sheep. It has been mentioned that in certain cases the affected animals have shown the presence of matted areas only at the tip of the wool, i.e., the lesion on the skin may have apparently undergone resolution and the scab been lifted from the skin. The scab is, however, prevented from falling off by reason of the fact that the wool is bound thickly in it, and that this wool may include even wool which has grown up from the site of the lesion. In such cases, the "scab" in the wool may represent a crust formed on the surface of the skin some three, four, or even more months previously. Microscopical examination of these tip-crusts shows the characteristic mycelia, but, more important, these mycelia are still viable and infective, as is evidenced by the fact that on preparing an emulsion of them and applying it to the skin of a healthy sheep the disease readily develops.

"Scabs detached forcibly from the skin, or those which are in process of elevation from the skin, are equally infective if kept dry in a bottle at room temperature, even over a year after removal from the sheep. This point emphasizes strongly the importance of preventing such scabs from becoming spontaneously detached from the fleece and falling to the ground, where it would seem they might remain infective for a considerable period. Particularly important is it that the disintegrating scabs do not fall in sheep yards where, even though they become more or less pulverised, it would appear likely that, from the nature of the material forming the scabs, the fungus

may remain viable. Such disintegrated scab material would, along with the dust of the yards, readily gain access to the wool of newly-shorn sheep, and, if conditions for propagation were suitable, the mycelium might develop and produce lesions of the disease. That the disease does at times attack sheep at a period some months after shear-

1.—Sheep Suffering from Mycotic Dermatitis in an Early Stage.

2.—Sheep Suffering from the Disease in an Advanced Stage.

ing, and must therefore have been "dust-borne," and is not necessarily spread by such a means as sheep-shearing-machines, is evidenced by the fact that cases have been seen where the only wool matted has been that at least 5 cm. from the tip, which fact would indicate that infection took place at a period when the year's fleece has been half-grown."

Symptoms.

No general symptoms are shown, and the disease can be discovered only by a manual examination of all sheep in an affected flock.

The first lesion formed is a marked hyperaemia of the skin. The affected skin is distinctly red, swollen and tender. As the disease progresses the skin becomes more normal in colour, and the affected area increases in size. In Dr. Seddon's experimental cases, this stage lasted about a fortnight, the skin meanwhile assuming a leathery appearance and eventually becoming dry and hard, and a thin but distinct scab appeared on the skin a fortnight after infection.

The scabs or crusts become thicker by the addition of more material from the skin surface until they assume a roughly pyramidal shape with the base on the skin. The wool fibres of the area are, of course, bound together by this mass. These scabs are dry, of a yellow colour and horn-like in appearance, but are rather friable, being of the colour and consistence of dried cheese, rather more opaque perhaps, and somewhat flaky at the inferior edge. The development of these scabs takes several weeks. In the experimental cases the scabs became elevated from the skin when of a thickness of 1.5 to 2 cm., and the growing wool fibres appeared between the crust and the skin. In these cases the crust remained attached to the skin by the wool fibres, gradually growing up with the wool until, after several months, the fleece merely showed matting together of areas at the top. These scabs would have been about 0.5 to 1.5 cms. in diameter.

Cases that have been seen in the field showed affected areas much larger than those described by Dr. Seddon. Lesions varying from one half inch to three inches in diameter were found—mostly on the back and loins. In several instances, a number of small lesions were found in close proximity to each other. The edges of these lesions were apparently quite active and would eventually coalasce to form quite large areas. The outer portion of the wool to a depth of about one and a half inches appeared quite normal, infection apparently not having taken place until some time after shearing. This is so general that one must conclude, either that the animals do not become infected during the summer months, or else that the growth of the organism is favoured by moist conditions and lower temperatures.

In some cases the tip only of the wool is matted with exudate, but in all probability this condition is the result of an infection active at shearing but which dies out when exposed to the sunlight.

Several sheep examined showed lesions of varying ages. In the most recently affected areas the skin showed marked hyperaemia, being dark red in colour and slightly swollen and extremely sensitive; the surface was shiny as though covered with moisture.

As the disease progresses the wool immediately overlying the affected area becomes matted together with a thin crust of exudate, and the colour of the skin gradually becomes more normal. Later on, a greater depth of wool is matted together with exudate; in some cases the scab becomes separated from the skin and is easily detached, except at the outer edges where it is firmly attached, forcible removal leaving an area of dry, scaly, pink skin surrounded by a raw bleeding edge which

is extremely sensitive. In other cases examined, the scab had been separated from the skin by the growth of new wool, the tips of this new wool being involved in the crust of exudate, while the underlying skin appeared quite normal.

In samples of wool forwarded to this office for investigation, the depth of the exudate varies considerably. Apparently in the more acute cases the wool is destroyed, and the scab separates from the skin before any great depth of exudate is formed; whilst in other, presumably milder cases, the wool is not destroyed, separation does not occur, and the exudate increases in depth with the growth of wool until eventually a depth of 2½ to 3 inches or even more is reached.

Dr. Bull has succeeded in obtaining growth of the casual organism on artificial media, and has carried out "observations on the power of various chemicals to check or prevent the disease in experimental animals, and also of the killing power of these chemicals in a test tube." As a result of these experiments he suggests "that the sheep, particularly the young animals, be dipped in a 1–500 copper sulphate solution. This can be obtained by dissolving 2 lb. of copper sulphate in 100 gallons of water." It is also suggested "that dipping be done in the late autumn, and where the affection is troublesome, a second dipping a month later will give added protection." Dr. Bull expresses the hope that field observations will confirm the use of copper sulphate in preventing the occurrence of the disease.

BEULAH CROP AND FALLOW COMPETITION.

The crop and fallow competition conducted by the Beulah Agricultural and Pastoral Society and judged by Mr. S. M. Champness of Kaniva attracted numerous entries, and considering the adverse season, the crops inspected were highly creditable to their growers.

The section for fallow, 1928, and the crops grown on that fallow in 1929, was won by Messrs. G. Murray and Son with an aggregate of 183 points. Mr. W. S. Chivell was second with 180 points, and Messrs. Bodey Brothers third with 179 points.

In the open crop section, Mr. L. E. Brennan was awarded first prize with a total of 94 points, Messrs. F. H. Edmonds and G. Murray and Son being equal second with 92 points.

The best fallow was shown by Messrs. Murray and Son who gained 88 points, Mr. R. W. Gibson being second with 86 points and Mr. F. H. Edmonds third with 85 points.

The winning crop in the aggregate competition was grown on a fallow that secured 91 points last year. The workings were as follow:—Worked, half with scarifier, half with combine in May; sown last week in June with light harrows attached to a combine with 70 lb. graded and dry pickled seed, and 100 lb. super. per acre; harrowed a week after sowing. The varieties were Strongbolt, Penny, and

Wannon. This crop was free from disease, showed neat workmanship, and promised to yield well. It also tied for second place in the open crop section.

Mr. Chivell's crop, although not so heavy in yield, was quite free from barley and almost free from foreign heads and disease, just a few white heads showing, and slightly tipped with frost. The land was worked with the spring-tooth in March after rain, to prevent drifting, and sown in the second week in June with the combine, harrows attached, with Penny wheat. 78 lb. of dry pickled seed were sown to the acre, with 93 lb. superphosphate. Portion of land was harrowed after sowing. This entry showed careful workmanship throughout.

Mr. Bodey's No. 2 entry ran Mr. Chivell's crop very close. The apparent yield was higher, but it lost points for barley showing in the crop.

In the open crop section, Mr. Brennan's crop of Free Gallopili appeared to be the heaviest yielder in the competition. The rate of seeding was 85 lb., with 90 lb. superphosphate per acre. The seed was dry pickled.

Workings were as follow:—Ploughed in May, 1928, with mould-board; combined in September and April, and sown early in June with the combine with harrows attached. It was a clean well headed crop, slightly tipped with frost, but filling well. There were a few dead heads showing.

Mr. F. H. Edmonds No. 2 entry was a promising crop of Nabawa and Penny, which, unfortunately, was badly tipped with frost, except for a small strip on one side, which looked as heavy or heavier than any crop inspected. Mr. Edmonds also lost points for bad misses with the drill. Workings were as follow:—Fallowed July, 1928, with mould-board plough, harrowed late in August, combined end September; com-bined second week in April, sown second week in June with combine, harrows attached. The seed used was 75 lb., with 90 lb. super. per acre. The land was harrowed three and four days after sowing.

The crops, on the whole, were clean and free from disease. A small number of charlock plants were the only weeds showing except in one crop.

The mulch on the land on which Mr. Hofmaeir's crop was growing appeared to be unduly deep for the dry season, and the roots of the wheat plant had not penetrated the seed bed which possibly accounts for the low apparent yield, as his fallow was in a leading position in 1928 with 93 points.

The only disease noted in some of the entries was a little flag smut. Only one case of loose smut, and one head of ball smut were seen in the whole competition, while some of the entries were entirely free from disease and weeds. This is a very creditable record.

Considering the scanty rainfall of about 150 points from sowing time until they were judged, and a rainfall of only 4½ to 5 inches for the year October to October, the crops inspected were remarkable, and show that the seventeen inches of rain that fell in the previous year must have been well conserved in the fallows by skilful working.

The fallows, as expected on such a low rainfall, showed lack of moisture, and in only four cases, on sandy loams, was there a moist

seed bed. It was very difficult for competitors to get their fallows in the best condition under such adverse conditions as they were unable to give the necessary workings to get the best results.

Details of awards are as follow:—

AGGREGATE—FALLOW, 1928. CROP, 1929.

Competitor.	Yield.	Purity.	Weeds.	Disease.	Evenness.	Crop, Total	Fallow, 1928.	Total.
Possible Points	**35**	**20**	**15**	**15**	**15**	**100**	**100**	**200**
G. Murray and Son ..	30	19	14	15	14	92	91	183
W. G. Chivell	28	19½	14	14½	13	89	91	180
Bodey Bros. No. 2 ..	30	18	15	14	14	91	88	179
L. E. Brennan	24	20	13	15	13	85	93	178
O. H. Collins	24	20	15	15	13	87	89	176
Bodey Bros. No. 1 ..	28	18	14	14	14	88	87	175
W. J. Collins	25	18	14	13	11	81	92	173
F. Scroope	23	20	14	14	12	83	88	171
A. Hofmaeir	25	18	12	14	13	82	93	175
Sanders Bros. No. 2 ..	27	19	13	13	12	84	86	170
Sanders Bros. No. 1 ..	23	20	14	12	10	79	88	167

OPEN CROP COMPETITION, 1929. 100 ACRES OF WHEAT (ON FALLOW).

Competitor.	Yield.	Purity.	Weeds.	Disease.	Evenness.	Total
Possible Points	**35**	**20**	**15**	**15**	**15**	**100**
L. E. Brennan No. 1 ..	32	19	14½	14½	14	94
F. H. Edmonds No. 2 ..	31	18	15	15	13	92
G. Murray and Son ..	30	19	14	15	14	92
Bodey Bros. No. 2 ..	30	18	15	14	14	91
F. H. Edmonds No. 1 ..	31	19	14	14	12	90
W. G. Chivell	28	19½	14	14½	13	89
Bodey Bros. No. 1 ..	28	18	14	14	14	88
L. E. Brennan No. 2 ..	29	19	14	12	14	88

FALLOW, 1929. 100 ACRES.

Competitor.	Moisture.	Cultivation	Absence of Weeds.	Mulch.	Total.
Possible Points	**25**	**25**	**25**	**25**	**100**
G. Murray and Son ..	15	23	25	25	88
R. W. Gibson	15	22	24	25	86
F. H. Edmonds	16	21	25	23	85
Bodey Bros.	17	21	24	22	84
Sanders Bros.	16	20	24	23	83
O. H. Collins	15	20	25	22	82
L. E. Brennan	15	20	22	23	80
A. Hofmaeir	16	21	20	22	79

PARTICULARS OF WORKINGS OF FALLOWS, 1929.

G. MURRAY AND SON (88 points)—
Wheat stubble. Half summer fallowed in March. Half scarified first week in July. Cross scarified August, cross harrowed end November.

R. W. GIBSON (86 points)—
Summer fallowed with scarifier end February. Cross scarified first and second week September.

F. H. EDMONDS (85 points)—
Ploughed middle May with Undercut. Harrowed early June. Combined August.

BODEY BROS. (84 points)—
Ploughed prong mouldboard July and harrowed. Cross harrowed October, cross harrowed early November.

SANDERS BROS. (83 points)—
Wheat stubble summer fallowed with combine in March. Cross combined in June, cross combined in August.

O. H. COLLINS (82 points)—
Wheat stubble fallowed early in July, half with mouldboard plough, half with Undercut Disc. Cross harrowed middle July, cross harrowed middle November.

L. E. BRENNAN (80 points)—
Combined in April. Combined in July.

A. HOFMAEIR (79 points)—
Ploughed Undercut about 3 inches deep early in May. Harrowed end May direction as ploughed. Combined first and second week July same direction as ploughed.

BENDIGO CROP AND FALLOW COMPETITION.

Report and Allocation of Awards.

By A. J. Blythman.

In the Fallow and Crop Competitions for 1929, conducted by the Bendigo Agricultural and Horticultural Society, the competitors operated under very adverse seasonal conditions. The low rainfall for the year seriously affected all plots inspected, and it is to be regretted that, owing to these influences, some competitors who were associated with the competition with their fallow plots were not in a position to put forward a crop for final allocation of awards.

Competitors a little more fortunate who were able to do so, showed that all plots had been carefully cultivated. Seed wheat varieties true to type had been well selected, and great care was taken in the cultivation methods to get the most from the sparse rainfall.

The winning crop shown by Messrs. Aitken Brothers, of Serpentine, was of the popular West Australian variety Nabawa, which appears

to be a good yielder, and under more favorable seasonal conditions should prove a sound wheat for the district. The crop was true to type, and fairly free from weeds. There were a few dead-heads and some slight flag smut. The crop was sown with 65 lb. of dry pickled seed and 80 lb. of super. per acre in the first week in June. The land was scarified and harrowed before sowing, which was done with the combine.

The second prize crop shown by the same growers was in somewhat similar condition to the prize-winning cup, the variety in this case being Ranee. Germination was slightly better, the land being of a more loamy nature and responding more favorably to the dry conditions. This plot was scarified and harrowed similar to the above, and was sown in May with 65 lb. of dry pickled seed and 80 lb. of super. per acre.

The third prize crop shown by Mr. J. Duffy, of Calivil, was Federation, sown on loamy soil. It showed a fair germination, but had suffered from the dry conditions. Strangers were in evidence, as well as a few wild oats. The plot showed signs of careful cultivation. It was sown with 80 lb. of dry pickled seed and 80 lb. of super. per acre, which were combined in at the end of May.

Mr. L. Laird, of Calivil, showed a well-cultivated plot of Free Gallipoli and Federation, the former filling out remarkably well under seasonal difficulties. Both varieties were true to type and clean, dead-heads and flag smut being less in evidence than on most plots. The plot demonstrated emphatically the value of careful fallowing. It was sown down with 60 lb. of dry pickled seed and 60 lb. of super. per acre. The fallow was combined in March, disced lightly in April, combined and sown in May.

Mr. G. Grylls, of Dingee, put forward an interesting crop of Ranee, portion of which had received special treatment with gypsum. The soil is somewhat heavy, and inclined to set, but where gypsum was applied it showed a distinct improvement, the surface being kept more open. The treatment further demonstrated an improved result in regard to yield when compared with other portions of the plot, and the judge estimated it would be at least 2 bushels to the acre better. The plot was sown with 65 lb. of wheat and 130 lb. of super. per acre. It showed signs of dead-heads and a little flag smut. The land was well cultivated, and it was unfortunate that more favorable seasonal conditions did not operate to give the fullest advantage to the care displayed in the treatment of the fallow. The land was combined and sown at the end of April, and harrowed after the crop was established.

Messrs. Collins Brothers, of Bridgewater, exhibited a well-cultivated plot of Waratah, and under good seasonal conditions this undoubtedly would have done well, but, owing to the dry influences, was light and uneven in parts. This variety, somewhat new to the district, is pleasing and appeared to be worth further testing. It has a good straw and head. A little flag smut was present, and dead-heads and odd thistles were seen. It was sown with 70 lb. of dry pickled seed and 100 lb. of super. per acre. The fallow was combined and sown at the end of April, and harrowed after being sown.

Mr. R. Collins, North Bridgewater, showed another well-cultivated plot of Currimp, a variety also new to the district and showing promise of doing well. It is a nice-headed wheat and was filling out well. Seasonal conditions undoubtedly prevented Mr. Collins' entry from being an excellent one. The crop was somewhat uneven, being light in parts and affected with dead-heads, odd thistles, and slight flag smut. It was sown on the 23rd May, combined and harrowed after sowing. Seventy-three lb. of dry pickled wheat and 110 lb. of super. per acre were used.

The awards are as follows:—

Name.	District.	Variety.	Yield.	Trueness to Type.	Freedom from—		Evenness.	Total Crops. 1929.	Fallows previously judged. Total.	Grand Total.
					Weeds.	Disease.				
Maximum	**points** ..	..	**35**	**20**	**15**	**15**	**15**	**100**	**100**	**200**
L. Laird ..	Calivil ..	Free Gal. and Fed.	28	14	11	9	13	75	61	136
R. Collins ..	N. Bridgewater	Currimp	25	12	9	7	11	64	71	135
Aitken Bros. (1)	Serpentine ..	Rance ..	26	15	10	9	9	69	65	134
Collins Bros. ..	Bridgewater ..	Waratah	24	12	9	7	10	62	71	133
Aitken Bros. (2)	Serpentine ..	Nabawa	25	15	10	6	5	61	67	128
J. Duffy ..	Calivil ..	Federation	26	10	12	7	13	68	59	127
G. Grylls ..	Dingee ..	Rance ..	24	13	10	10	12	69	51	120

MELTON CROP COMPETITION.

Report of the Judge, Mr. V. G. Butler, Rockbank.

In the crop competition held under the auspices of the Melton Progress Association nine entries were inspected and, despite the dry conditions earlier in the year, some very nice crops were shown. In some a good deal of loose smut and foot-rot were noticed; these diseases would have been avoided had the dry pickling method been followed. In several cases strangers were seen among the crops, suggesting that greater care is required in obtaining cleaner seed. Wild oats were very prevalent.

The winning crop, shown by Mr. C. E. Barrie, was a very fine crop of Mogul standing about 3 feet high, nicely headed, even and free from weeds and disease. The next best entry was that of Mr. T. Norton, who exhibited a nice crop, also of Mogul. Although a good all round crop it was considered to be a little short in the straw. Mr. J. Knox, of Diggers' Rest, showed a nice crop of Major, beautifully headed, but badly down in places through wind and rain. Among the other exhibits was a nice crop of Warden shown by Mr. G. Coburn.

Messrs. Robinson Bros.' crop was grown on land ploughed in June, harrowed immediately, rolled in August, combined in October, harrowed in February, and sown with the combine in May. Ninety pounds of Sepoy wheat, formalin-pickled, and 90 lb. of super. were used per acre.

Mr. G. Coburn ploughed his land in July, harrowed it in August, cultivated in October, February, May, and sowed with the combine 90 lb. of Warden wheat, dry pickled, and 90 lb. of super. per acre.

Mr. I. Robinson's land was ploughed in August, cultivated before harvest, cultivated twice before February, and sown in May at the rate of 90 lb. of Major wheat and 90 lb. of super. per acre.

Messrs. Cantwell Bros. and Minns ploughed their land in March, harrowed it in April, and at the beginning of May 90 lb. of Mogul wheat and 112 lb. of super. were sown with the combine. The land was harrowed and rolled after drilling.

Mr. J. Knox's land was ploughed in May, 1928, 4½ inches deep, harrowed in June, one-way disced in October, spring-toothed in February, cultivated in May, harrowed and sown third week in May with 80 lb. of Major wheat and 100 lb. of super. per acre. The land was rolled after the drill.

Mr. T. Norton ploughed his land in January, harrowed it twice in April, spring-toothed in May and sowed with 90 lb. of Mogul wheat, dry pickled, and 140 lb. of super. per acre. The land was cross-harrowed after the crop came up, and was rolled in July.

Messrs. Wallace Bros.' crop was grown on land ploughed in July, 1928, to 4 inches deep, harrowed twice before harvest, cultivated and harrowed, twice rolled and drilled first week in May with 90 lb. of dry pickled Gallipoli wheat and 120 lb. of super. per acre.

Details of awards are as follow:—

RESULTS.

Competitor.	Variety.	Yield.	Purity.	Absence of—		Evenness.	Total.
				Weeds.	Disease.		
Possible Points ..	..	**35**	**20**	**15**	**15**	**15**	**100**
C. E. Barrie ..	Mogul	30	18	14	15	14	91
T. Norton ..	Mogul	27	19	15	14	15	90
J. Knox	Major	32	18	13	12	14	89
G. Coburn (1) ..	Warden.. ..	27	18	14	14	14	87
I. Robinson ..	Major	28	17	13	14	14	86
G. Coburn (2) ..	Major	28	17	14	13	13	85
Robinson Bros. ..	Sepoy	26	18	14	13	14	85
Wallace Bros. ..	Gallipoli ..	27	17	13	12	14	83
Cantell Bros. & Minns	Mogul	24	17	14	12	13	80

POTATO FIELD CROP COMPETITION.

KOROIT, PORT FAIRY, AND WARRNAMBOOL DISTRICTS.

FOR TROPHY PRESENTED BY THE COMMONWEALTH FERTILIZERS AND CHEMICALS LTD.

Report of Judge, J. T. Ramsay, Department of Agriculture.

A gratifying response of sixteen entries was made in this competition by growers of the above districts. The conditions governing the competition were that not less than 2 acres should be submitted to the judge, and that inspection and weighing should be completed before the 21st December. Owing to the latter condition, the majority of the varieties entered were of the early maturing type, chiefly New Zealand Pink Eye. On account of the high prices prevailing, some of the competitors had dug and marketed their competition crops prior to the date of judging.

The soil cultivation given to all of the crops was good, but the cleanness, as far as freedom from weeds was concerned, was considerably affected by the phenomenal rains experienced this year, which promoted a luxurious growth of weeds difficult to cope with on account of the broken nature of the weather.

A gratifying feature noticeable was the close spacing of the crops, which ranged from 29 to 32 rows per chain. Nine out of the ten entries judged were spaced at 30 and over rows per chain. There is no doubt that this better spacing is in part, at least, due to the results of last year's competition and the comments made thereon.

A Variety which has been Allowed to Degenerate.

The majority of the competitors submitted crops planted with the New Zealand Pink Eye variety. Unfortunately, this variety, which has been strongly favoured for many years past in the Western District, has been steadily depreciating in prolificacy, due first to lack of selection of seed, and secondly, to lack of exercise of disease control measures. As a consequence, nearly all of the New Zealand Pink Eye crops grown in the district had their yields seriously reduced, owing to the low percentage of germination which took place. It is regrettable that such a variety, which has for many years past so well suited the soil and climate of this district as an early-producing variety, and which (except in seasons of high prices) it is scarcely profitable to cultivate, should have been allowed to degenerate to its present low standard of productiveness. This degeneration is almost entirely preventable in any variety of potatoes, and in the case of New Zealand Pink Eye it can be combated even at this late stage by the application of selective treatment of seed and disease control practice. A notable illustration of this possibility can be shown by what has been done with the Brown's River variety, which at one time was probably 80 to 90 per cent. of Victoria's crop, but which, through lack of care, degenerated in productiveness to such a degree that it practically went out of cultivation. Some years ago a small quantity of this latter variety was taken in hand

on the Millbrook experimental plots. For the first two or three years only very moderate returns per acre were obtained from it, but, by the application of fairly drastic selective treatment, at the end of five years it produced a crop of 13½ tons per acre, consisting of excellent tubers. What can be done with one variety can be done with another, and there is very strong evidence from the present producing capabilities of the New Zealand Pink Eye variety that such selective treatment is absolutely necessary if it is going to remain in cultivation.

Few of the competitors gave their crops any assistance by applying manures, and there is no doubt that this also had a reducing effect on the yields. Two years ago experimental manure trial plots were instituted at Illowa in the centre of the district judged and, while it is too early yet, owing to seasonal variations and the shortness of the period over which the trials have been conducted, to be dogmatic, there is strong indication that the application of moderate dressings of manure at somewhere about 3 cwt. of superphosphate per acre are likely to be very beneficial. The 1928-29 figures from the no-manure plot are 3 tons 9 cwt. per acre, whereas the plot treated with superphosphate at the rate of 3 cwt. per acre gave a yield of 5 tons 12 cwt., or an increase of no less than 68 per cent.

There was considerable interest by growers evidenced in the competition, and it is anticipated that a good deal of improvement will take place in their potato cultural practice as a result.

Appended are the results of the judging:—

Competitor.	Variety.	Rows per Chain.	Cleanness.	Evenness.	Quality.	Weight per Acre.	Points for Weight.	Total Points.
Possible Points	.. .. ..	..	**10**	**10**	**35**	..	**45**	**100**
						T. C.		
H. McCosker ..	Carman 3 ..	32	8	7	33	7 11	42	90
A. Skilbeck ..	Clark's Main Crop	32	9	9	32	5 11	31	81
D. Lane ..	N.Z. Pinkeye ..	32	8	7	30	6 5	35	80
W. J. Anderson..	,, ..	29	6	6	30	6 10	36	78
A. O'Keefe ..	Carman and Dates	31	7	8	30	5 18	33	78
A. Skilbeck ..	Clark's Main Crop	30	7	8	18	8 0	45	78
D. Foley ..	N.Z. Pinkeye ..	32	7	6	30	3 11	20	73
O'Toole Bros. ..	,, ..	31	9	6	30	4 14	26	71
James Gleeson ..	,, ..	30	9	6	30	3 1	17	62
J. J. Gleeson ..	,, ..	30	9	5	28	1 6	7	49
P. Gibbin ..	Withdrawn from competition.							
J. Ahearn ..								
J. Sheen ..								
G. McCosker ..								
W. Bowman ..								
D. Bowman ..								

In allotting the points the possible 45 is given to the heaviest crop, and to the others *pro rata*.

It is noticeable that, although this competition is for early maturing crops, the first and second highest scorers are from mid-season or late varieties. The full explanation of this is that the seed of these varieties was of better constitution, and freer from Rhizoctonia affectation than the seed of the quick maturing varieties.

WHEAT EXPERIMENTS.

Results at Swan Hill.

Various wheat experiments were begun last year at Swan Hill on the farm of Mr. Douglas Brydon. They comprise variety and manurial trials with wheat, and the method of experimentation used is that now adopted as standard by the Department, and is known as the replication method. Under this system each plot is repeated eight times over, and each is sown alongside a check plot of some standard treatment. This method enables a degree of accuracy of the work to be calculated, and also the rejection of any results as not significant where they do not comply with a predetermined standard of accuracy.

The results are as follow:—

VARIETY TRIALS.

Sown 22nd-24th May, 1929, with 65 lb. of dry pickled seed per acre and 94 lb. of 22 per cent. superphosphate per acre.

—	Average Yield.	Yield of Control Yandilla King.	Increase or Decrease over Control.
	Bush. per acre.	Bush. per acre.	Bushels per acre
Free Gallipoli	9·4	8·7	Increase 0·7
Sepoy Selection 324J	9·6	9·0	„ 0·6
Rajah	8·3	8·7	Decrease 0·4
Rance 4H	8·9	10·7	„ 1·8
Federation	6·2	9·0	„ 2·8
Penny	9·6	8·7	Increase 0·9*
Nabawa	10·5	10·7	Decrease 0·2*
Currawa	8·3	8·8	„ 0·5*

* Results not significant.

Though the yields were low, it is a wonder, considering the failure of winter and spring rains, that any wheat was harvested at all. The rainfall during the growing period, 5.07 inches, was received almost wholly as light showers which, falling on dry soil, remained near the surface and was rapidly dissipated.

In properly interpreting the data from these plots, the average increase or decrease compared with the average yield of the appropriate control plots sown to Yandilla King was the only figure that was valid. On this basis Free Gallipoli gave a higher yield than the control, Yandilla King, by .7 bushel an acre, and Sepoy Selection by .6. Rajah, the new selection Rance, 4H, and Federation were all inferior to Yandilla King, Federation being so to the extent of 2.8 bushels an acre. In the case of Penny, Currawa, and Nabawa, despite the fact that eight plots of each were tested in the approved manner, the results have been proved by calculation to be unreliable, and accordingly are discarded. The unreliability is due to unforeseen irregular variations in the soil on which these particular wheats were planted. The Werribee crossbreds, Free Gallipoli and Sepoy, had beaten Federation

by 3.5 and 3.4 bushels an acre respectively. Thus the superiority of these new varieties over Federation for Northern Mallee conditions has been further confirmed.

In addition to the foregoing tests, observation tests were made on a number of other varieties. In these tests, new crossbreds, Currawa x Major x Gallipoli, Canberra x Hard Federation, and Rajah 228 I, were superior to Free Gallipoli, and Mogul, Waratah, Ranee 1H, Ranee 4H, Ranee x Rajah, Confederation, Bald Early, Mac's White, and Joffre were inferior.

Accurate replicated manurial tests were conducted with Free Gallipoli wheat with the following results:—

WHEAT MANURIAL TESTS.

48 plots, each 1-30th acre, sown 22nd-24th May with 65 lb. Free Gallipoli seed per acre.

—	Yield, 1929.	Average Yield of No Manure Plots.	Increase over No manure.
	Bush. per acre.	Bush. per acre.	Bushels.
Super., 60 lb. per acre	5·6	3·9	1·7*
Super., 90 lb. per acre	6·5	3·9	2·6*
Super., 120 lb. per acre	7.3	3·6	3·7*
Super., 150 lb. per acre	8·2	3·6	4·6*

* Results of all plots have been shown by statistical examination to be reliable.

The results show that, despite the dry seasons, important increases in crop yield have been secured with the use of each successive amount of superphosphate up to 150 lb. per acre, the maximum amount tried. Valuing wheat at 4s. 9d. a bushel and superphosphate at £5 5s. per ton, the increased net return per acre due to superphosphate is given in the following table:—

EXTRA RETURN DUE TO SUPERPHOSPHATE.

—	Increase over No Manure.	Value of Increase at 4s. 9d. per bush.	Cost of Super. at £5 5s. ton.	Increased Net Return per Acre.
	Bush. per acre.	*s. d.*	*s. d.*	*s. d.*
Super., 60 lb. per acre ..	1·7	8 1	2 10	5 3
Super., 90 lb. per acre ..	2·6	12 4	4 3	8 1
Super., 120 lb. per acre ..	3·7	17 7	5 7	12 0
Super., 150 lb. per acre ..	4·6	21 10	7 0	14 10

Thus the most profitable amount of manure to have applied at Swan Hill last year was 150 lb. per acre, which amount gave an extra net return of 6s. 9d. an acre over and above that derived from the crop treated with 60 lb. of superphosphate per acre, an amount often applied in the district.

However, a departmental recommendation to substantially increase the amount of superphosphate normally used at Swan Hill must await the accumulation of further data from these plots during the next few years.

NEW ZEALAND'S APPLE EXPORTS.

The following interesting report on New Zealand's apple export trade has been published by the *New Zealand Annual Export Review*, 1929:—

"With the exception of the Otago district, the whole of the fruit export trade is under the organization of the Control Board, whose aim it is to distribute the fruit to the best possible advantage. In distributing, market preferences are at all times considered, and this year for the first time the fruit cases have been specially marked to ensure that the sizes and varieties will be despatched to the proper markets. It is found that the green apples sell better in the Continental markets than they do in the United Kingdom, that the larger-sized green apples do better in Germany, while the small green apples do remarkably well in Sweden. It is to take advantage of these market preferences that the special marketing was instituted, the aim being to find a market for all sized apples and supply each market with the size it desired. The South American market received 166,000 cases this year, as compared with 80,000 cases last year. This market is developing well, and it is highly probable that these figures can be increased with good results. A small consignment was again sent to the Canadian market; this year on a c.i.f. basis of 15s. per case. The Canadian market holds great possibilities, and it should be possible for New Zealand to send large quantities, and in doing so care should be taken with regard to the varieties and grades forwarded in order that no false step, detrimental to the main consignments or to New Zealand's prestige, will be made.

"For several years the Continental market has been tested by transhipping consignments from Hull, but during the past season direct shipments to the Continent were made; 25,000 cases were forwarded to Hamburg, mainly on a c.i.f. basis of 14s. per case. The bulk of the Continental fruit was forwarded to Rotterdam for transportation. At Rotterdam arrangements were made to supply most of the Continental centres, and for the cool storage of fruit should market conditions not favour immediate sales.

"The United Kingdom is still our main market, and is regarded as being the most even. New Zealand's name for quality stands very high throughout the United Kingdom, and every endeavour is made to maintain this high standing while developing increased sales. It is estimated that with proper distribution this market can consume far greater quantities than we are at present sending. The financial results are not yet completed, but indications show that in the main everything will be very satisfactory, although not quite as good as was anticipated when it was learnt that the Australian crop was well below normal. The deficiency from Australia was over-balanced by the surplus from the United States, which latter country had a phenomenal crop, resulting in heavy cool storage stocks. The fact that United States of America exported to Europe 750,000 cases to arrive on the Easter market, whereas the normal consignment at that time of the year was

approximately 100,000, well indicated the severe competition that was experienced from United States on the Continent and British markets. This competition continued until a very late date.

"So far as can be seen at present there is no likelihood of a call being made on the Government guarantee. This guarantee is now on a basis whereby it could, with safety, be extended indefinitely. The guarantee is no longer a guarantee covering cost of production, but simply a guarantee of marketing costs. Eleven shillings per case is approximately the amount required to transport the fruit from the orchards of New Zealand to the various overseas markets and pay commission, wharfage, &c. This being so, it will only be in a case of disaster that the guarantee is likely to be called on.

"The export crop of last year was distributed as follows:—

United Kingdom—		
London	420,863	
Southampton	173,851	
Glasgow	42,115	
Avonmouth	24,314	
Liverpool	18,294	
Manchester	9,518	
		688,955
South America—		
Rio	45,303	
Monte Video	120,613	
		165,916
Continent—		
Hamburg	24,940	
Rotterdam	97,898	
		122,838
Canada—		
Halifax	12,000	
		12,000
		989,709

QUANTITIES SUPPLIED FROM VARIOUS DISTRICTS.

Auckland	80,969
Poverty Bay	13,754
Hawke's Bay	140,209
Wairarapa	7,757
Marlborough	35,547
Nelson	615,218
Canterbury	8,345
Otago	87,911
	989,709"

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

If the work has not already been done, the orchard should be kept in constant cultivation so as to conserve the abundant spring rains. Should the summer become hot and dry, this will be a very necessary precaution. Even where the soil had been previously well cultivated, the cultivators should again be run over the surface, as any hot weather will cause the soil to crust, which would be the means of dissipating a very considerable amount of soil water. Every effort should be taken to retain this moisture so that the fruit crops shall have all they require for their perfection. To further attain this end no weeds should be allowed to grow in orchard soils

BUDDING.

Young trees, or old trees that have been previously cut down in preparation for budding, may be worked towards the end of the month. It is advisable to select dull, cool weather for this operation, so that the sap may run more freely, and that atmospheric conditions may not have too drying an effect on the bud. The operation of budding is a very simple one, and is easily performed. To gain a successful end, the sap should be flowing freely, so that when the cuts are made the bark should "lift" or "run" easily, and without any clinging or tearing of the fibres, and it should separate freely from the wood. The bud selected should be firm and well matured, and should show no signs of premature growth whatever. It should be cut from the scion with a shallow cut, and if any wood be left in the cutting it should be taken out of the bud. A smooth, clean spot should be selected on the bark of the stock, and a T-shaped cut made, the vertical cut being longer than the horizontal one. The bark at the point where the cuts meet should be raised, and the bud inserted between the bark and the wood of the stock. The bud should be gently pressed down into position, and then bound with soft twine, string, or raffia. If the bud be too long for the cut, the top may be cut off level by means of a horizontal cut. With practice it will soon become possible to take the buds so that they will need neither cutting nor trimming.

After two or three weeks the buds should be examined to see if they have "taken"—that is, if the bud has united thoroughly to the stock. When this occurs, the tie may be cut. If a growth be desired at once all wood above the bud may be cut off some short distance above the bud, so as to prevent any bark splitting, and consequent loss of the bud, and so as to throw the bud out at a fair angle. Ultimately this should be properly trimmed.

If desired, the bud may be left dormant throughout the autumn and winter till spring. In this case the branch should not be cut off, but left on till the usual winter pruning.

SUMMER PRUNING.

Care should be observed that as much of the leafage as possible is retained on the tree. Unduly long laterals of fruiting trees may be shortened back, always cutting to a leaf. Unnecessary terminal leader growths, of which there are sometimes three or four, all strong growing, may be reduced to one, retaining this one as a leader. In no case should this growth be cut or interfered with in any way.

The results of these cuts will be to divert the sap which was flowing into growths that would subsequently be pruned, into more profitable channels, so that weak buds and growths may be strengthened, and induced into fruit bearing.

The Vegetable Garden.

The work in this section is much the same as in the flower garden. Good mulching and regular soil stirring will be the work for the month. As soon as any bed is cleared of vegetables it should be manured and well dug over in preparation for the next crop. Deep digging is always desirable in vegetable growing. If any pest, such as aphis, pea mite caterpillars, or tomato weevil, have been present, it would be advisable to burn all the crop refuse, or to destroy any insects that remain, and to give the plot a dressing of Clift's manurial insecticide and lime in equal parts.

Keep the tomatoes well watered and manured, pinching out surplus and strong grown laterals. In early districts the onion crop will be ripening. In late districts, or with late crops, the ripening may be hastened by breaking down the top. An autumn crop of potatoes may be planted. Cabbage, cauliflower, lettuce, and celery plants may be planted out. Keep asparagus and rhubarb beds well watered.

The Flower Garden.

January should be a busy month in the garden. It may be necessary to water frequently, and after every watering the surface should be well loosened, and stirred with the hoe to keep it moist and cool. More cultivation and less water is a good rule to be observed. The hoe should be used more, and the hose less, in summer; greater benefits will accrue, and the water bill will be considerably reduced. Mulchings with straw, grass, &c., are very useful just now. The mowings from lawns form valuable mulching. Waste tobacco stems are also valuable as a mulch.

Dahlias, chrysanthemums, gladioli and other tall-growing, slender herbaceous plants will require support in the way of stakes. They will also need mulching considerably. These plants should receive no check whatever, and should be continued with a regular even growth right through the season. Another desideratum is that soils should be well drained, as plants of all descriptions thrive better in well-drained soils.

A sharp look-out should be kept on these plants for attacks of red spider. If this insect appears, a good spraying of tobacco solution or benzole emulsion should be given.

Constant watch will need to be kept for the various small caterpillars that attack the buds of these plants. Spraying with a weak solution of paris green and lime, or similar insecticide, will be useful. Hand-picking should also be resorted to.

Seeds of sweet pea, Iceland poppy, mignonette, primula, wall-flower, stocks and pansies should now be sown for winter flowering.

REMINDERS FOR FEBRUARY.

LIVE STOCK.

HORSES: *At grass.*—Supplement dry grass, if possible, with some greenstuff. Provide plenty of pure water and shade shelter. *In stable.*—Supplement hard feed with some greenstuff, carrots, or the like, and give a bran mash once a week at least. Avoid over-stimulating foods, such as maize and barley. Give hard feed in quantities only consistent with work to be performed. Stable should be well ventilated. and kept clean. When at work, give water at short intervals. Always water before feeding. Great benefit will result in supplying horses—more especially young ones running at grass—with a lick. The following one is recommended:—

Salt	20 parts
Lime	20 parts
Superphosphate	10 parts
Sulphate of iron	5 parts.

By having troughs constructed that will protect the lick from rain a considerable saving will be made.

Horses at grass require their feet attended to at frequent intervals, otherwise deformity of feet and lameness may result.

CATTLE.—Continue to aim at succulence of ration either by including ensilage (where practicable) as the roughage, or by judicious rationing of the summer grazing crops. Remember neither to graze the millet right down nor to let it get away into the seed stalk. Make up any seasonal deficiency in paddock feed to whatever extent the cow's producing capacity calls for, using roughage in greater or less proportion according to the nature of the deficiency to be met. Build up the springing cows, even though dry, for the approaching lactation. Remember also the needs of your animals for growth of both flesh and bone. Where leguminous material (clovers, trefoils, lucerne, &c.) is out of requisition give to young calves a dessertspoon of cod liver oil in each one's milk daily, and give older animals bone-meal with the hand feed (a heaped tablespoon daily for grown calves, up to two tablespoons for growing heifers and milking cows, and even four spoons daily for heavy milkers). Also, keep the cattle-lick always on offer. See that all animals, and especially milking cows, get their due amount of good water daily. The drinking of water should be encouraged in every way in milking cows. Don't miss the shallow scuffling between the maize drills after every rain. Be ready for a favorable opportunity towards the end of the month to sow a catch oat crop for early autumn grazing, but don't risk any big area so early. Have some ground in clean fallow for a bigger sowing later. Continue to use the extra summer precautions to circumvent flies—get the manure spread early, wire-gauze the milk room, and keep same darkened, if nothing less serves; cultivate an aversion to the drowning of flies in milk or cream, and don't be content to regard it as unavoidable. If there are any stagnant swamps or lagoons that the milking cows have access to, be on guard against ropy milk or cream; when still water containing plant growth becomes nicely warmed, organisms grow apace, and the

ropy milk germ is very likely to be among them. Keep cows out of such water. If the trouble arises consult your dairy supervisor. The bull should now be kept from the herd in early districts to avoid out of season calving.

PIGS.—Allow pigs to have access to pasture; rape makes excellent grazing. Provide shade, and keep them well supplied with drinking water. When the milk supply is going off, the grain ration should be balanced by the addition of meat meal; 10 lb. of meat meal to 100 lb. of grain gives a balanced ration; mixed grains give better results than the use of only one variety. A good mixture for young pigs when no milk is available would be—60 lb. pollard, 40 gristed barley, 10 lb. meat meal, 6 lb. linseed meal. With grain at 1d. per lb. fattening of pigs will prove a very profitable enterprise.

SHEEP.—Ewes with a predominance of British blood do not come regularly into season until the present month. This is particularly the case in Gippsland and South-western Victoria, if these strong-woolled ewes were bred in the cool wet districts. Most of the pure-bred ewes of British origin very seldom take the ram until February, March, or even as late as April, with the possible exception of studs bred in the north, or recently imported.

Lamb's dropped in July, August and September may suit certain districts in the south, but early lambs are most profitable in normal years north of the Divide. To breed out this late-lambing tendency, and to procure quality and quantity of wool as well as a good framed sheep, use well-bred and well-woolled large-framed Merino rams on all strong-woolled cross-bred ewes. Narrow hard-looking rams are usually active workers, and in a flock of ewes with other rams, they often get the greatest number of lambs. If any such rams are of necessity to be used, keep them back for a few weeks, and join later with the flock after the best of the rams have been running with the ewes for at least three weeks.

The second dipping of sheep affected with tick or louse can be undertaken this month. A good water supply is vital. Provision should be made for prevention against fire and losses by disease or drought, also blow-fly pest.

Great care should be taken in regard to blow-fly pest. If at all troublesome fly-traps should be set; a pamphlet giving information regarding the construction of traps is obtainable from the Department of Agriculture.

POULTRY.—Young pullets should be put into their permanent laying pens before they commence laying; once they start laying they should not be shifted. Pullets that show signs of laying while too young should be fed on the plainest of feed; it should consist chiefly of grain. Grain is less forcing than is mash.

Provide plenty of succulent green feed.

Cockerels which are intended for breeding should be given plenty of liberty; this will often prevent losses as a result of fighting. One old male bird placed with each pen of cockerels will help to keep order.

At this time of the year Epsom salts and sulphur should be given alternately each week in the wet mash—about 1 oz. to twenty birds. The salts should be dissolved in the liquid with which the mash is mixed. The sulphur should be mixed with the dry bran before it is moistened.

Disinfect perches and nests for vermin.

Ventilators should be provided under the roof along the whole length of the roosting houses to ensure a good circulation of air during the hot weather.

Remember that good layers are heavy eaters. Hens feel the heat most from midday till late afternoon; therefore, attention to ventilation and water supply is essential at that time on days when the weather is warm.

ORCHARD.—Spray for codlin moth. Search out and destroy all larvæ. Cultivate the surface where necessary and irrigate where necessary, paying particular attention to young trees. Fumigate evergreen trees for scale. Continue budding.

FLOWER GARDEN.—Cultivate the surface and water thoroughly during hot weather. Summer-prune roses by thinning out the weak wood and cutting back lightly the strong shoots. Thin out and disbud dahlias and chrysanthemums. Layer carnations. Plant a few bulbs for early blooms. Sow seeds of perennial and hardy annual plants.

VEGETABLE GARDEN.—Continue to plant out seedlings from the seed-beds. Sow seeds of cabbage, lettuce, cauliflower, peas, turnips, and French beans. Keep all vacant plots well dug. Use Clift's and lime for pea mite.

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Valuable for its green or dried fodder, and as a winter soiling crop for orchards, vineyards, &c., on irrigated land.

A strong-growing annual, with succulent fleshy stems and broad, soft leaves. The flowers are cream or pale yellow in colour and are clustered together in a compact, cylindrical spike.

The first cut is available from 45 to 65 days after sowing, followed by a second and third cut and sometimes a fourth, although the latter is never heavy and is usually reserved for seed.

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This Clover will re-seed itself in a pasture on good land and thus become practically permanent. Sow 8 to 12 lb. per acre in drills, or 20 to 30 lb. broadcast.

"Misskawi" Brand, Specially Re-Machine-cleaned Seed, 1/3 lb.; 120/- cwt.

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Purple Top Yellow Aberdeen, Green Top Yellow Aberdeen (both Yellow-fleshed varieties), each **2/-** lb.
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Elephant, Skirving's Purple Top, Champion Purple Top (Purple-top varieties), each **2/6** lb.
Ne Plus Ultra, 2/6 lb.; **Kangaroo** (Bronze-top varieties), **2/6** lb.

(Sow 3 lb. of Seed per acre.)

RAPE

(Sow 4 to 6 lb. per acre in drills; 8 to 12 lb. broadcast)

Somner's "Tip-Top" True Giant Kangaroo Rape (We are the original introducers)—**10d.** lb.; **80/-** cwt.
Dwarf Essex—Imported English (true), **8d.** lb.; **65/4** cwt.; Imported Dutch, **7d.** lb.; **60/-** cwt.; New Zealand, **7d.** lb.; **60/-** cwt.

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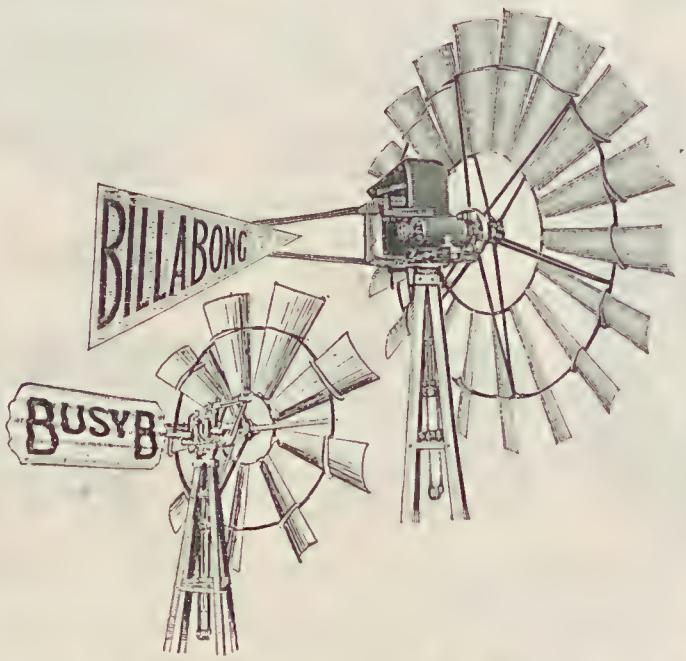

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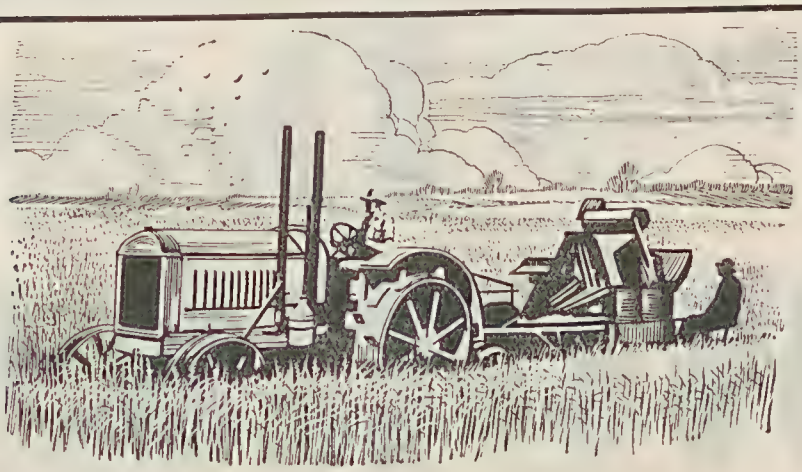

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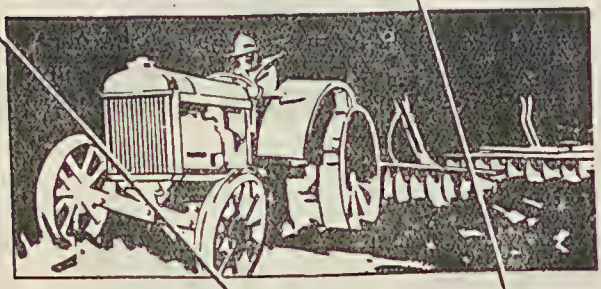

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MOSS VALE, N.S.W.

"I planted out Phenomenal Maincrop the last week in January and they just got a nice start, but the latter part of February and March were very dry, and the cabbage fly was very bad, and the plants were so badly eaten and infested that I nearly decided to plough them in. However, I gave them a chance and left them. In April we had very heavy rains, as you will remember (17" here), and after that my cauliflowers began to come again from the centres and now they are just beginning to heart, and I will have 75% of good hearts. The last two months, May and June, have been fairly dry and very frosty, and altogether these cauliflowers have had as hard conditions as you could imagine."

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G.Sire .. BARONSON (10981 C.S.B.) by BARON'S PRIDE
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